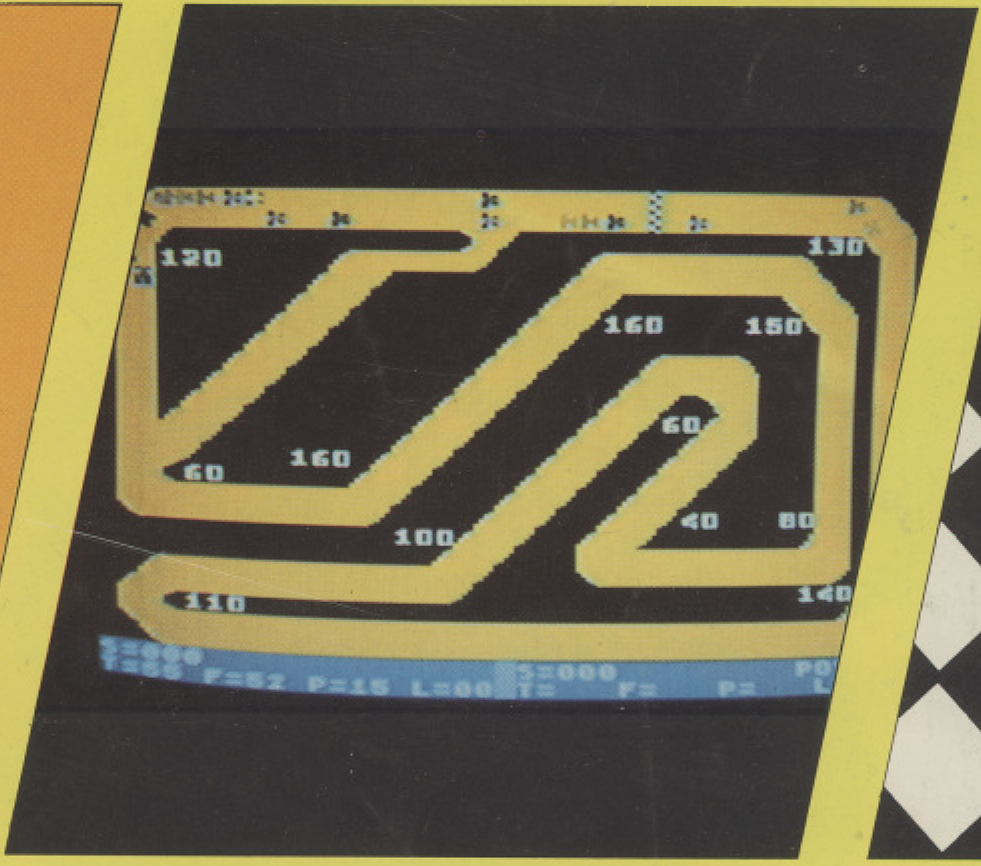
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Atari Users Magazine

Issue 18

90p





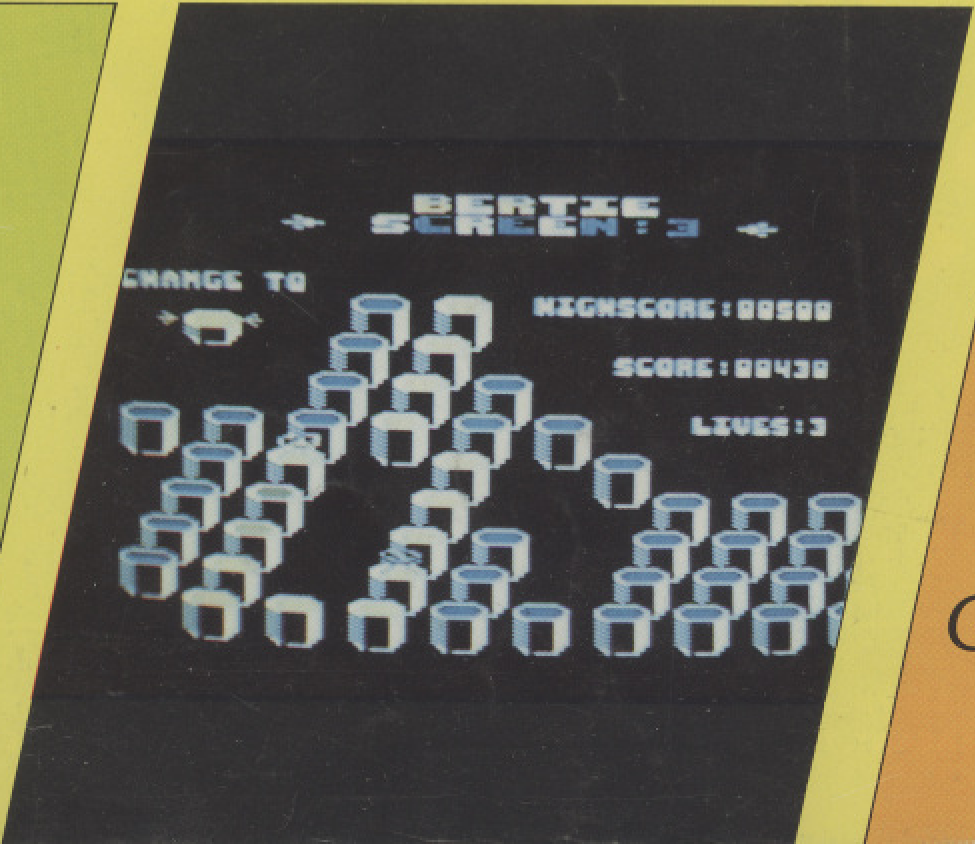
REVIEWS

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ST

software news

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BERTIE

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PAGE 6 Atari Users Magazine

November/December 1985

Editor & Publisher
Les Ellingham

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PAGE 6 is a user's magazine and relies entirely on readers' support in submitting articles and programs. The aim is to explore ATARI computing through the exchange of information and knowledge. We will endeavour to pay for articles and programs where appropriate and we hope that you will gain satisfaction from seeing your work published. In turn we hope that you will learn from articles submitted by other readers. All published material is eligible for awards in the Annual Readers' Poll and may receive additional Editorial awards as announced from time to time in the magazine.

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Copy date for the next issue is 6th November. Publication date 12th December 1985

Editorial

ST - DIVIDING THE COMMUNITY?

I have mixed thoughts about the ST. On the one hand it *is* an Atari and will certainly be of great interest to many of our readers who for the past couple of years have been trying to stretch their 800's or XL's beyond what most uninformed people thought possible. On the other hand there is a danger that the machine will drift off into the heavy business end to become the preserve of business men who have no interest in computing as such. This side was graphically represented by a gentleman on the Atari stand at the PCW show who looked down his nose in disdain when I introduced myself as the publisher of an Atari Users magazine. ' We only produce products for business men' he said.

As I sit and write I have an ST lying idle beside me. Idle because there is no software available and, much to my regret, I won't have the time to explore it in the same way as I did my old 800. I am afraid that programming for myself has had to go by the board since I started PAGE 6. I bought it for several reasons. I want to run all of the business and subscription side of PAGE 6 on an Atari machine. I have been proud of the fact that every single facet of PAGE 6 has been accomplished using Atari equipment from the beginning but I have to admit that at times it has been a struggle! The 520 ST will provide all the power that I will ever need to continue and improve PAGE 6. I also want to keep in touch with all the different types of software that will become available. I must admit that I was not looking forward to the machine with the same excitement as when I just *had* to have that 400 all those years ago, but now that I have played a little with it, all the old excitement has come back. I want to know what's inside, I am eagerly awaiting the first books, dying to get hold of software and longing to explore all over again.

The 520 ST (and the 260 ST) has immense power and an excitement for *all* users and it would be a tragedy if it becomes a business only machine. I am sure that won't happen but I would love to know your views. Will you buy one? What will you use it for? Why not write and tell me?

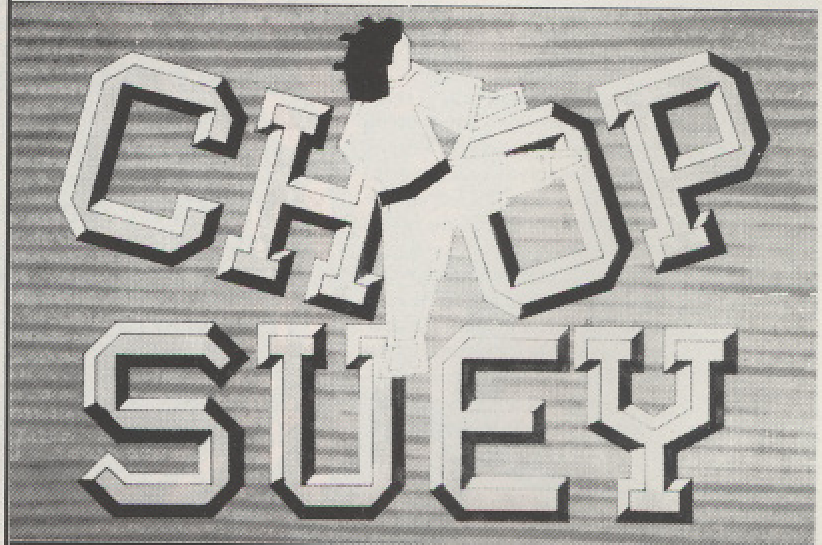
PIRACY

I have said my piece. You all know where PAGE 6 stands and I don't intend to bore you by publishing any more on this subject but something was brought to my attention at the PCW show that must be aired.

The message is obviously getting home and Atari users are finally getting better recognition from the software companies but there is one sick individual out there who could set us all back a couple of years. Ken Ward of the Norwich User Group has always been an outspoken advocate of Atari and has criticised both piracy and software companies for charging high prices. The software companies are slowly responding but Ken showed me a number of items he had received from an aggrieved pirate which contained fabrications about him and even included myself in its sick diatribe. Now if it were just a private campaign I would not bother but this individual is distributing pirated disks and copies of DOS which state that they are pirated by Ken and the Norwich Users Group. My name has also been mentioned and if (when) these get into the hands of an unsuspecting software house all the work we have done on your behalf over the past couple of years will be gone.

If you see any disks or publications of this sort, ignore them, or better still destroy them. If anybody knows who is responsible put him right. You will be the one to lose in the long run. A number of individuals have worked hard over the past couple of years to promote Atari for the benefit of all genuine users and Ken Ward is one of them.

Les Ellingham



SOFTWARE APPROVAL SCHEME

Having to buy most software by mail order means that you often have to take a chance on the quality of the product. In order to give you some help, Atari have started a 'Software Approval Scheme' in which they will regularly evaluate software and issue an 'Atari Approved Software' label for the best. Among those software packages to have earned approval so far are EARTHVIEWS, and SPACE BASE from Antic, RESCUE FROM FRACTALUS and BALLBLAZER from Activision, PAPERCLIP AND B-GRAPH from Batteries Included, PRINT SHOP and BANK STREET MUSIC WRITER from Broderbund, MICROBASE+ from Silicon Chip, ACTION! and BASIC XE by O.S.S., ZORRO and KENNEDY APPROACH from U.S.GOLD, HITCH HIKERS GUIDE TO THE GALAXY from Infocom. pFORTH from Bignose Software, THE FACTORY by Hesware, SYNCALC by Synapse and, finally, PINBALL CONSTRUCTION SET and SEVEN CITIES OF GOLD from Ariolasoft.

Most of these titles should be available from your local dealer but if you have difficulty try Software Express on 021 384 5080.

NEW ARIOLASOFT DEAL

Ariolasoft who already have an exclusive licensing deal with Electronic Arts and Broderbund to release their products in this country have now signed an agreement with the Canadian firm Batteries Included a company noted for its support of Atari in the 'serious' field. Ariolasoft will be bringing out Batteries Included's new range of integrated software for the ST which includes a stock portfolio manager, word processor, combined spreadsheet and graphics package and a database manager.

DAILY MIRROR REVOLUTIONISES NEWS!

Mirrorsoft, another of Robert Maxwell's companies have under development for the ST a program that could change the face of club and society newsletters and small publications. Entitled FLEET STREET EDITOR it is a full design and layout system for small publications capable of driving a photo-typesetter. The package for the ST is being designed by the person responsible for the Daily Mirror's own page make-up software and is expected to be available early next year.

NEW HARDWARE BARGAINS

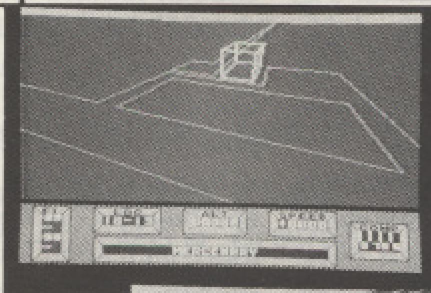
If you have missed the announcements elsewhere, think now about buying a friend a Christmas present. The 800XL with joystick is now £69.95 and a pack with a data recorder sells at £99. If you want something for yourself how about upgrading to a 130XE with 1050 disk drive and four pieces of software for £265? Or you can get a 1027 printer thrown in for a total of £350. The bargains keep coming!

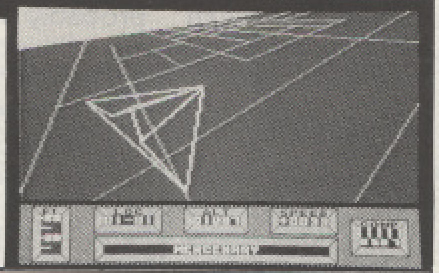
W.E.E. HAVE GONE.

W.E. Electronics who have advertised add-ons in past issues have advised that 'due to commitments in other areas' it will be unable to support its computer peripheral products and cannot take further orders. After sales support to previous purchasers will continue.

News

MERCENARY!





MERCENARY - Escape from Targ needs no further recommendation other than to say it is the successor to ENCOUNTER one of the finest British programs of last year. A combination of flight simulator, adventure and arcade fun it promises to show once again that not all the top software comes from the States.

What does it look like? See for yourself.

DIGITISE!

We have had numerous enquiries over the past couple of years for a means of digitising pictures on the Atari. Now a company in the States has introduced COMPUTEREYES which retails at £130 for the basic unit. With it you can digitise any printed image, but you can do more. An attachment is available for a video camera and special transfer sheets can be purchased enabling iron-on transfers for tee-shirts to be made on an ordinary dot-matrix printer. For further details contact Digital Vision, 14 Oak St. #2, Needham, MA 02192, U.S.A.

ATARI BITS

..... The ST OS ROM should be available by now. At the time of writing the price to those who already have an ST is said to be £12.

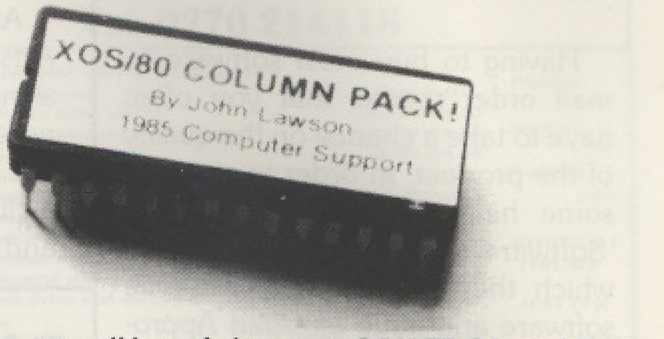
..... There are rumours that you will shortly be able to buy the ST *in bits* such as the CPU on its own.

..... Attributed to Jack Tramiel -'We'll be having higher capacity disks (for the ST), CD ROMs will be available in early 1986 and we'll also have higher resolution colour graphics in the machine'

..... A 'well informed source' in the States claims that Atari sold 50,000 (yes!) 520ST's in the first six weeks on sale, thus outselling the Macintosh.

XOS/80 COLUMN PACK

from Computer Support
Price £69.95



I have to admit that this is a review of a product that I have not personally tried but others who have used it have raved over it and urged me to do a review. Why haven't I tried it? Well, as far as hardware goes I am a complete novice and on my 800XL at least, it requires the desoldering of a chip and the resoldering of the XOS chip. That, believe me, is no job for a complete novice! Don't be put off from reading on though because if you want one Computer Support will fit it for you.

At first sight an 80-column pack would seem to be of interest only to dedicated word-processors but behind the product title lies a whole host of changes to the XL/XE Operating System which you might well wish to consider. First though that 80 column mode.

You are not stuck with 80 columns. What the chip does is give you an 80 column option which is enabled by holding the SELECT key on power-up otherwise the machine defaults to normal 40 column mode. In order to ensure the maximum readability the screen is forced to black and white in 80 column mode and other standards (in both modes) include a faster keyboard response, a properly centred screen and the cursor redefined as an underline. All editing facilities remain the same but the character set has been redefined to include that elusive £ sign in lieu of the backslash. It would probably have been better to redefine the hash (#) as this is the ASCII standard for a £ sign on most printers, and put the hash in place of the backslash. Maybe they will do this on a later revision. So far, excellent changes to make the machine much more professional as far as word processing is concerned.

Most software packages that use the recognised screen and editor handlers will work fine but some that have short cuts to the OS may not work. Computer Support have been working on a number of patches to these and can probably advise whether your word processor will work or get it to work.

Let's go back to 40 column mode. Here you will get a default screen of green with white characters and a number of other changes. Perhaps most important is compatibility with the old Revision B OS which means that virtually all your software will now run without the need for a Translator. Now, that is probably of great interest to cassette users, who up to now have had to miss out, and cassette owners will find another bonus. The cassette load and save has been adjusted to 820 baud so that all programs will save and load some 40% faster and they will be still be compatible with other machines. If you are into commercial games most of which boot without BASIC you will be pleased to find that the use of the OPTION key has been reversed so there is no need to hold it down to boot software.

Programmers will benefit by using CONTROL and TAB to stop/start scrolling of listings allowing one finger control, and having full error messages displayed (and buzzed!). No more hunting for manuals. And programmers will also find many other items of interest for several features of the OS can be controlled by software.

Other changes include the halving of printer timeout and the echoing of joystick ports 3 & 4 from the old OS to ports 1 & 2 allowing programs that use these ports to run on the XL/XE.

What sort of support can you expect from Computer Support having forked out £69.95? Well firstly they offer a full year guarantee on all products and secondly will provide you with an updated ROM, whenever amendments are made, for a fee of £6 which will include the latest instructions. As far as updates go, there is a spare 3K on the chip and Computer Support invite your suggestions for its use. If there is some feature that you think is missing or you think could be improved, tell them and you may well find it on a subsequent revision. The people there are certainly knowledgeable and will try to ensure that you get the best from the product.

To sum up then, a lot of useful features are hidden behind what appears to be a straight 80 column screen handler. If you are confident with electronics or are lucky enough to have an early 800XL with socketed chips you should have no problems in fitting the XOS yourself but if you have any doubts you can send your machine to Computer Support and have it fitted. This will push up the price by a further £15 but a repair will cost a lot more.

If you would like to get a look at the XOS before buying and have a User Group nearby ask the Secretary to get in touch with John Lawson at Computer Support and he will probably arrange to give a demonstration.


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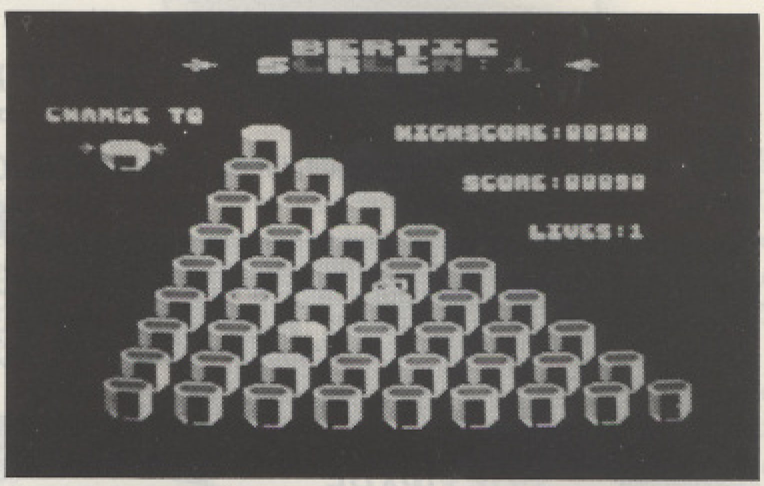
BERTIE

Welcome to Bertie, a variation of the classic game of Q-Bert.

The object of the game is to move Bertie about so that he colours in every cube on the screen without falling off the pyramid, falling into the hole (which moves!) or being caught by the frog. After a lot of patience and practice screens 1, 2 and 6 can be done but the rest are easier to give you a breather. Once a screen has been completed the game continues from that level even after the game is over. You have 3 lives, look after them!

Pressing START or the fire button will start the game and Bertie is controlled by left, right or diagonal movement of the joystick. To pause during play, press any key and press a key again to resume. Pressing OPTION at any time during play will abort the game.

A machine code routine from PAGE 6 Issue 13 has been used to display the Player Missiles. It also allows 48 frames to be stored in memory for each Player. Intricate animation can be achieved with the use of this routine. To call up a Player use MC=USR(1568,A,B,C,D) where A= Player number, B= X co-ordinate, C= Y co-ordinate and D= frame number. This routine appears in lines 20000 to 20040.



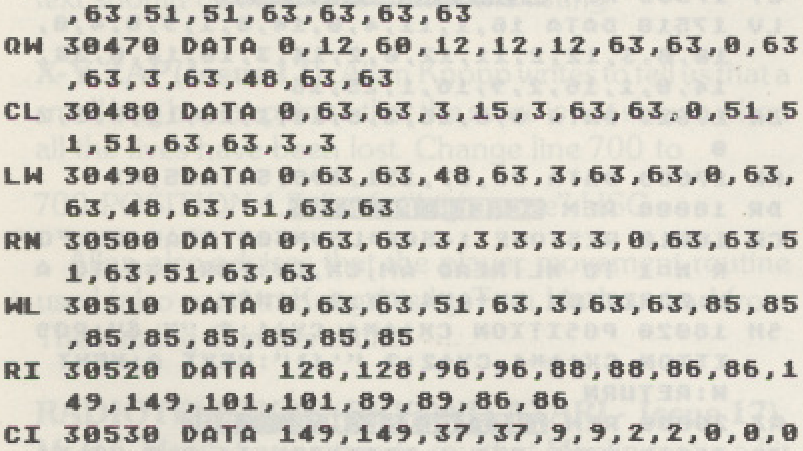
by Michael Kempster

TYPING IT IN

Simply type in both listings and save them on the same disk or on tape one after the other. If you are using cassette make sure that you change line 150 as stated in the REM and if you use disk SAVE the second listing with the filename "D:BERTIE.2". RUN the first listing which will automatically load the second.

```
HV 0 REM ********************************
WP 1 REM *            BERTIE            *
VD 2 REM *              by              *
ZC 3 REM *      Michael  Kempster       *
HP 4 REM * ---------------------------- *
MM 5 REM *  PAGE 6 MAGAZINE - ENGLAND   *
IB 6 REM ********************************
UF 10 ? CHR$(125):POKE 82,0:POKE 752,1:PO
   KE 710,0:GOSUB 30000
OZ 15 POKE 559,0:REM SET UP DISPLAY LIST
RK 20 RESTORE 30:DL=PEEK(560)+PEEK(561)*2
   56:POKE DL+3,71:FOR I=6 TO 24:READ A:P
   OKE DL+I,A:NEXT I
GC 30 DATA 7,6,6,2,2,4,4,4,4,4,4,4,2,6,6,
   7,7,2,65
QQ 40 POKE DL+25,PEEK(560):POKE DL+26,PEE
   K(561):POKE 708,119:POKE 709,15
QI 50 POKE 710,0:POKE 711,60:POKE 756,CHS
   ET:? CHR$(125):POSITION 2,0
FY 60 ? "PARAMOUNTAIN":POSITION 30,0:? "s
   oftware":POSITION 6,1:? "presents":POK
   E 752,1:POKE 559,34
AZ 80 RESTORE 500:FOR ROW=4 TO 10:FOR COL
   =5 TO 34:READ A:IF A=7 OR A=8 THEN A=A
   +128
JW 90 IF A=0 THEN A=64
OD 100 POSITION COL,ROW:? CHR$(A+96):NEXT
    COL:NEXT ROW
LA 110 POSITION 9,12:? "by":POSITION 2,13
   :? "michael kempster"
ZC 120 POSITION 4,14:? "PLEASE WAIT LOADI
   NG MAIN PROGRAM"
ST 150 POKE 87,2:RUN "D:BERTIE.2":REM FOR
    CASSETTE USE POKE 764,12:CLOAD
PJ 199 END
VM 500 REM DATA FOR BERTIE TITLE SCREEN
RB 510 DATA 0,5,5,5,0,0,5,5,5,0,0,5,5,5,0
   ,0,5,5,5,0,0,5,5,5,0,0,5,5,5,0
UN 520 DATA 6,3,1,1,2,6,3,1,1,2,6,3,1,1,2
   ,6,3,1,1,2,6,3,1,1,2,6,3,1,1,2
XZ 530 DATA 6,1,7,7,7,6,1,7,7,7,6,1,7,7,7
   ,0,4,7,7,7,0,4,7,7,7,6,1,7,7,7
AP 540 DATA 6,1,7,0,7,6,1,7,2,0,6,1,7,0,7
   ,0,6,1,7,0,0,6,1,7,0,6,1,7,2,0
ON 550 DATA 6,1,7,7,8,6,1,7,7,0,6,1,7,7,8
   ,0,6,1,7,0,0,9,1,7,0,6,1,7,7,0
UD 560 DATA 6,1,7,0,7,6,1,7,1,2,6,1,7,1,7
   ,0,6,1,7,0,6,3,3,7,2,6,1,7,1,2
IT 570 DATA 0,4,7,7,7,0,4,7,7,7,0,4,7,4,7
   ,0,0,4,7,0,0,4,7,7,7,0,4,7,7,7
PP 30000 REM REDEFINE CHARACTERS
BB 30010 CHSET=PEEK(106)-8:CH=256*CHSET:D
   IM CHAR$(70):RESTORE 30300
GW 30020 POSITION 14,10:? "PLEASE WAIT":P
   OSITION 14,12:? "CHARACTER:"
CO 30030 CHAR$="!#$%&'():ABCDEFGHIKLMNOPR
   STUVWY0123456789abcdefghi*+,[]"
NP 30040 FOR I=1 TO LEN(CHAR$)
FO 30050 CHPOS=CH+(ASC(CHAR$(I))-32)*8:IF
    ASC(CHAR$(I))>96 THEN CHPOS=CH+(ASC(C
   HAR$(I)))*8
WA 30060 FOR A=0 TO 7:READ B:POKE CHPOS+A
   ,B:NEXT A:POSITION 24,12:? CHAR$(I,I)
CN 30070 NEXT I:RETURN
```

```
SB 30300 REM DATA FOR GRAPHICS CHARS.
WF 30310 DATA 0,3,13,53,53,53,61,15,0,255
   ,85,85,85,85,85,255
CX 30320 DATA 0,240,92,87,87,87,95,255,51
   ,12,51,12,51,12,51,12
LH 30330 DATA 63,63,63,63,63,63,63,63,51,
   12,51,12,15,3,3,0
VY 30340 DATA 0,0,0,0,0,0,63,0,63,63,63,6
   0,60,48,240,0
TU 30350 DATA 0,0,12,12,0,12,12,0,0,28,62
   ,119,127,119,119,119
QI 30360 DATA 0,126,115,126,127,115,127,1
   26,0,63,112,112,112,127,127,63
XX 30370 DATA 0,126,115,115,115,127,127,1
   26,0,127,112,124,112,127,127,127
SU 30380 DATA 0,127,112,124,112,112,112,1
   12,0,63,112,112,119,115,127,62
WG 30390 DATA 0,119,119,127,127,127,119,1
   19,0,127,28,28,28,127,127,127
WP 30400 DATA 0,115,119,126,124,126,119,1
   15,0,96,96,96,96,127,127,127
MA 30410 DATA 0,99,127,127,127,107,99,99,
   0,115,123,127,127,119,115,115
HZ 30420 DATA 0,62,119,119,119,127,127,62
   ,0,126,115,127,126,112,112,112
SC 30430 DATA 0,126,115,127,126,119,119,1
   19,0,63,127,112,126,7,127,126
KD 30440 DATA 0,127,127,28,28,28,28,28,0,
   119,119,119,119,127,127,62
TS 30450 DATA 0,119,119,119,119,127,62,28
   ,0,99,99,107,127,127,127,99
AS 30460 DATA 0,119,119,127,28,28,62,62,0
   ,63,51,51,63,63,63,63
QW 30470 DATA 0,12,60,12,12,12,63,63,0,63
   ,63,3,63,48,63,63
CL 30480 DATA 0,63,63,3,15,3,63,63,0,51,5
   1,51,63,63,3,3
LW 30490 DATA 0,63,63,48,63,3,63,63,0,63,
   63,48,63,51,63,63
RN 30500 DATA 0,63,63,3,3,3,3,3,0,63,63,5
   1,63,51,63,63
WL 30510 DATA 0,63,63,51,63,3,63,63,85,85
   ,85,85,85,85,85,85
RI 30520 DATA 128,128,96,96,88,88,86,86,1
   49,149,101,101,89,89,86,86
CI 30530 DATA 149,149,37,37,9,9,2,2,0,0,0
   ,0,0,0,170,170
DS 30540 DATA 2,2,2,2,2,2,2,2,255,255,255
   ,255,255,255,255,255
PP 30550 DATA 255,252,240,224,216,248,254
   ,255,2,2,2,2,2,2,170,170
FI 30560 DATA 0,3,14,58,58,58,62,15,0,255
   ,170,170,170,170,170,255
IM 30570 DATA 0,240,172,171,171,171,175,2
   55,0,0,48,12,255,12, 48,0
WC 30580 DATA 0,0,12,48,255,48,12,0
JT 30590 REM FINISH - PART ONE
```




```
HW 1 REM ******************************
MA 2 REM *    BERTIE - MAIN PROGRAM    *
PF 3 REM *            by               *
KP 4 REM *     Michael  Kempster       *
HQ 5 REM * --------------------------- *
LC 6 REM *          AUG 1985           *
IC 7 REM ******************************
MH 10 GRAPHICS 0:CHSET=PEEK(106)-8:POKE 7
   10,0:POKE 756,CHSET:GOSUB 20000:LEV=1
GB 20 LI=3:SC=10:S$="00010":HI$="00500"
SG 30 GOSUB 13000:GOSUB 14000
FE 40 POSITION 23,0:? " [ SCREEN:";LEV;"
   ]":POSITION (X-50)/4,(Y-38)/8:? "*+,":
   FOR N=1 TO 300:NEXT N
YW 50 GOSUB 100:POKE 707,0:X1=TX:Y1=TY:GO
   SUB 200:TX=X1:TY=Y1:MC=USR(1568,3,TX,T
   Y,6):GOSUB 90:GOSUB 96
AY 60 GOSUB 100:X1=IX:Y1=IY:GOSUB 200:IX=
   X1:IY=Y1:POKE 707,15:MC=USR(1568,2,IX,
   IY,5-FR):GOSUB 90:FR=FR+1
GN 65 IF FR>1 THEN FR=0
GK 70 GOSUB 96:GOTO 50
TR 90 IF (X=TX+1 AND Y=TY-6) OR (X=IX AND
    Y=IY) THEN POP :GOTO 400
ZN 91 IF PEEK(764)<>255 OR PEEK(53279)=3
   THEN POKE 764,255:GOTO 700
AJ 95 RETURN
TE 96 SOUND 0,100,10,10:FOR N=1 TO 15:NEX
   T N:SOUND 0,0,0,0:RETURN
GW 100 REM MOVE MAN
RO 105 X1=X:Y1=Y:S=STICK(0):Z=0
TH 110 IF S=11 THEN X1=X1-16:GOTO 170
XF 120 IF S=7 THEN X1=X1+16:GOTO 170
XG 130 IF S=6 THEN X1=X1+4:Y1=Y1-16:GOTO
    170
CH 140 IF S=5 THEN X1=X1+12:Y1=Y1+16:GOTO
    170
VZ 150 IF S=10 THEN X1=X1-12:Y1=Y1-16:GOT
   O 170
VX 160 IF S=9 THEN X1=X1-4:Y1=Y1+16
YP 170 IF X1>50 THEN LOCATE (X1-50)/4,(Y1
   -38)/8,Z:IF Z=42 OR Z=33 THEN X=X1:Y=Y
   1
NL 180 IF X1>50 THEN SOUND 0,200,10,10:FO
   R N=1 TO 20:NEXT N:SOUND 0,0,0,0:IF Z=
   33 THEN GOSUB 300
LW 190 MC=USR(1568,0,X,Y,0+FR):MC=USR(156
   8,1,X,Y,2+FR):RETURN
WH 200 REM MOVE THINGS
ZM 210 IF X<=X1 AND Y<Y1 THEN X2=-12:Y2=-
   16:GOSUB 270
NJ 220 IF X>=X1 AND Y<Y1 THEN X2=4:Y2=-16
   :GOSUB 270
RM 230 IF X<=X1 AND Y>Y1 THEN X2=-4:Y2=16
   :GOSUB 270
UO 240 IF X>=X1 AND Y>Y1 THEN X2=12:Y2=16
   :GOSUB 270
UM 250 IF X>X1 THEN X2=16:Y2=0:GOSUB 270
SB 260 IF X<X1 THEN X2=-16:Y2=0:GOSUB 270
VS 270 LOCATE INT(X1+X2-50)/4,INT(Y1+Y2-3
   8)/8,Z:IF Z=42 OR Z=33 THEN X1=X1+X2:Y
   1=Y1+Y2:POP :RETURN
ZO 280 RETURN
GJ 300 REM COLOUR CHANGE
EF 305 MC=USR(1568,0,X,Y,0):MC=USR(1568,1
   ,X,Y,2)
PP 310 SC=SC+10*LEV:S$(6-LEN(STR$(SC)),5)
   =STR$(SC):POSITION 30,7:? S$:IF HI$<S$
    THEN HI$=S$:POSITION 30,4:? HI$
NY 320 POSITION (X-50)/4,(Y-38)/8:? "*+,"
   :FOR N=5 TO 10:SOUND 0,100*N,10,10:NEX
```

→

```
   T N:SOUND 0,0,0,0
XI 330 DON=DON+1:IF DON=AMO THEN POP :GOT
   O 600
ZH 340 RETURN
DI 400 REM LOSE LIFE
CY 410 FOR N=1 TO 3:MC=USR(1568,N,0,0,0):
   NEXT N:MC=USR(1568,0,X,Y,0):POKE 623,5
   :FOR A=1 TO 9
GJ 420 FOR N=9 TO 1 STEP -1:POKE N+PM,PEE
   K(PM+N-1):POKE PM+A-1,0:NEXT N:MC=USR(
   1568,0,X,Y,0)
HJ 430 SOUND 0,50+A*10,8,10:NEXT A:SOUND
   0,0,0,0:MC=USR(1568,0,0,0,0):GOSUB 200
   40
QK 440 POSITION (X-50)/4,(Y-38)/8:? "*":L
   I=LI-1:IF LI=0 THEN 500
SQ 450 POKE 623,1:GOSUB 13070:MC=USR(1568
   ,0,X,Y,0):MC=USR(1568,1,X,Y,2):MC=USR(
   1568,2,IX,IY,4)
FO 460 MC=USR(1568,3,TX,TY,6):FOR N=1 TO
   200:NEXT N:POSITION 35,10:? CHR$(30);L
   I:GOTO 50
KS 500 REM GAME OVER
OV 510 POSITION (X-50)/4,(Y-38)/8:? "*":P
   OSITION 25,0:? "gAmE oVeR":RESTORE 55
   0:FOR N=1 TO 8:READ A,B
XD 520 SOUND 0,A,10,10:FOR C=1 TO B*4:NEX
   T C:FOR C=5 TO 0 STEP -1:SOUND 0,A,10,
   C:NEXT C:NEXT N
RZ 530 FOR N=1 TO 100:NEXT N:SC=10:S$="00
   010":LI=3:DON=1:GOTO 30
PH 550 DATA 171,15,227,7,227,5,203,15,227
   ,20,0,1,179,12,171,15
RX 600 REM NEXT SCREEN
MG 610 POSITION (X-50)/4,(Y-38)/8:? "*":S
   OUND 0,100,10,10:SOUND 1,200,10,10:SOU
   ND 2,150,10,10:POKE 53768,13
JM 620 POSITION 21,0:? "▮sCrEeN cOmPlEtEd
   ▮":FOR A=1 TO 500:NEXT A:FOR N=0 TO 3:
   SOUND N,0,0,0
ZL 630 MC=USR(1568,N,0,0,0):NEXT N:LEV=LE
   V+1:IF LEV>6 THEN LEV=1
BE 640 GOSUB 13000:GOTO 40
YR 700 REM PAUSE AND ABORT
VU 710 IF PEEK(53279)=3 THEN FOR N=0 TO 3
   :MC=USR(1568,N,0,0,0):NEXT N:GOTO 750
GC 720 IF PEEK(764)=255 THEN 720
XN 730 POKE 764,255:RETURN
IW 750 ? CHR$(125):POSITION 25,0:? "GAME
   ABORT":FOR N=1 TO 400:NEXT N:GOTO 30
SK 13000 REM SCREEN DLI
SJ 13010 POKE 559,0:DL=PEEK(560)+PEEK(561
   )*256:POKE DL+3,70:POKE DL+6,6:FOR A=7
    TO 28:POKE DL+A,4:NEXT A
UW 13020 POKE DL+29,65:POKE DL+30,PEEK(56
   0):POKE DL+31,PEEK(561):POKE 623,1:POK
   E 559,58:POKE 82,0:? CHR$(125)
GX 13030 POKE 708,118:POKE 709,30:POKE 71
   0,15:POKE 711,60:POSITION 7,0:? "berti
   E":POSITION 0,3
PP 13040 ? "CHANGE TO":POSITION 2,5:? "▮*
   +,▮":POSITION 20,4:? "HIGHSCORE:";HI$
SI 13050 POSITION 24,7:? "SCORE:";S$:POSI
   TION 28,10:? "LIVES:";LI:POSITION 3,6:
   ? "'()":POKE 752,1
RO 13060 GOSUB 18000:DON=1:FR=0
QV 13070 RESTORE 14600+LEV*500:READ X,Y,I
   X,IY,TX,TY,AMO:RETURN
TL 14000 REM PRINTUP
SG 14010 SOUND 0,100,10,6:SOUND 1,200,10,
   10:POKE 53768,13:FR=0
TZ 14020 POSITION 22,0:? "▮ PRESS  START
   ▮":POKE 707,0:FOR A=1 TO 75:NEXT A:MC=
   USR(1568,0,X,Y,0+FR)
NA 14030 MC=USR(1568,1,X,Y,2+FR):MC=USR(1
   568,2,IX,IY,5-FR):MC=USR(1568,3,TX,TY,
   6):FR=FR+1:IF FR>1 THEN FR=0
GD 14040 POKE 707,15:POSITION 22,0:? "  P
   RESS  START  ":FOR A=1 TO 75:NEXT A
IU 14050 IF PEEK(53279)=6 OR STRIG(0)=0 T
   HEN SOUND 0,0,0,0:SOUND 1,0,0,0:FR=0:R
   ETURN
ZQ 14060 GOTO 14020
JQ 15000 REM 1ST SCREEN ROUTINE
AD 15010 DATA 9,0,11,4,1,10,6,2,9,8,3,8,1
   0,4,7,12,5,6,14,6,5,16,7,4,18,8,3,20
MC 15100 DATA 95,67,191,195,62,201,45
AI 15500 REM 2ND SCREEN ROUTINE
DO 15510 DATA 12,1,11,4,1,10,6,2,9,8,5,0,
   10,2,3,12,1,19,12,1,6,14,3,22,14,2,5,1
   6,2,21,16,7,4,18,7,7,20
LD 15600 DATA 111,67,79,195,50,121,46
CC 16000 REM 3RD SCREEN ROUTINE
GU 16010 DATA 17,1,11,4,1,10,6,2,9,8,5,0,
   10,1,3,12,0,15,12,0,23,12,1,2,14,0,14,
   14,2,26,14,1,1,16,1,13,16
AP 16020 DATA 2,25,16,1,0,18,1,12,18,3,24
   ,18,8,3,20
XC 16100 DATA 111,67,187,147,50,121,47
GA 16500 REM 4TH SCREEN ROUTINE
FO 16510 DATA 18,1,11,4,1,10,6,0,9,8,0,17
   ,8,2,0,10,1,16,10,0,3,12,3,11,12,8,2,1
   4,0,1,16,2,9,16,0,25,16
KR 16520 DATA 0,33,16,0,0,18,2,8,18,1,24,
   18,0,36,18,8,3,20
XR 16600 DATA 111,67,187,147,50,121,47
FY 17000 REM 5TH SCREEN ROUTINE
WC 17010 DATA 14,0,11,4,1,10,6,2,9,8,5,0,
   10,4,3,12,0,2,14,5,14,14,0,1,16,1,17,1
   6,0,33,16,0,0,18,1,16,18
DS 17020 DATA 0,36,18,8,3,20
PO 17100 DATA 95,67,187,147,78,201,41
GY 17500 REM 6TH SCREEN ROUTINE
LV 17510 DATA 16,1,11,4,0,14,6,1,9,8,4,0,
   10,0,3,12,2,11,12,0,2,14,3,10,14,0,30,
   14,0,1,16,2,9,16,1,25,16
ZA 17520 DATA 0,0,18,2,8,18,1,28,18,8,3,2
   0
RK 17600 DATA 95,67,191,195,50,185,41
DR 18000 REM SCREEN PRINTUP
CW 18010 RESTORE 14500+LEV*500:READ NL:FO
   R N=1 TO NL:READ AM,CX,CY:FOR A=0 TO A
   M:POSITION CX+A*4,CY:? "!#$"
SH 18020 POSITION CX+A*4,CY+1:? "% &":POS
   ITION CX+A*4,CY+2:? "'()":NEXT A:NEXT
   N:RETURN
RZ 20000 REM INITIALISE M/C - PMG
OD 20010 POKE 752,1:POSITION 14,2:? "PLEA
   SE WAIT":PMST=PEEK(106)-16:PM=PMST*256
   :RESTORE 20200:FOR A=1536 TO 1758
BQ 20020 READ B:POKE A,B:NEXT A:POKE 5427
   9,PMST:POKE 704,15:POKE 705,56:POKE 70
   6,10:POKE 53277,2
OB 20030 POSITION 14,2:? "ALMOST DONE":MC
   =USR(1536,PMST):DIM S$(5),HI$(5):POKE
   559,58
ME 20040 RESTORE 20300:FOR A=0 TO 6:FOR B
   =0 TO 9:READ C:POKE PM+A*16+B,C:NEXT B
   :NEXT A:RETURN
IM 20199 REM DATA M/C
XQ 20200 DATA 104,104,104,141,218,6,24,10
   5,4,141,219,6,169,0,162,3,157,200,6,20
   2,16,250,169,7,162,6,160,67,32
EW 20210 DATA 92,228,96,169,1,141,220,6,1
   04,104,104,170,104,104,157,208,6,104,1
   04,157,212,6,104,104,157,204,6
KG 20220 DATA 169,1,157,200,6,169,0,141,2
   20,6,96,173,220,6,240,3,76,98,228,162,
   3,189,200,6,208,6,202,16,248,76
EN 20230 DATA 98,228,142,216,6,169,0,157,
   200,6,141,221,6,189,204,6,201,16,16,21
   ,189,204,6,10,10,10,10,133,205
```

continued on page 58

UPDATE

We will publish the update column in future issues to advise you of any errors, amendments or enhancements to programs or articles in previous issues. If it's not here you can assume that it was right in the first place!

DRAUGHTS (Issue 16). We had dozens of explanations of why this did not work on the 800 but only two readers got it right. The problem is a bug in the 800 OS which wipes out 64 bytes past RAMTOP when 'clear screen' is printed. The fix is simply to change line 10000 to

10000 POKE 106,PEEK(106)-10:Q=PEEK(106)+2:N=Q*256

Disk subscribers will find an amended version on this issue's disk.

BLACK BOX (Issue 16). An occasional error creeps in at line 8130. Change the first part of the line to

Z=INT(RND(0)*100)+1

RENUM (Issue 17). The number in the USR call in the text should be 32768 to match the listing.

X-Y-ZAP (Issue 17). Allan Knopp writes to tell us that a small bug has crept in so that the score is not shown when all the lives have been lost. Change line 700 to

700 POSITION 4,7: ? #6; "high score";HSC

Allan also advises that the player movement routine used (also used in Kanga) is by Tom Hudson and from The Analog Compendium.

RADIOTELETYPE (BEYOND ATARI - Issue 17). Mr R.C.Marsh has written to say that Maplin make a kit for a RTTY terminal for use with the Atari (Kit no. LK53H) and that Maplin Magazine published a comprehensive article in their September 1984 issue.

TYPO 3!

by Alec Benson

And now for something completely ... similar but so much better!

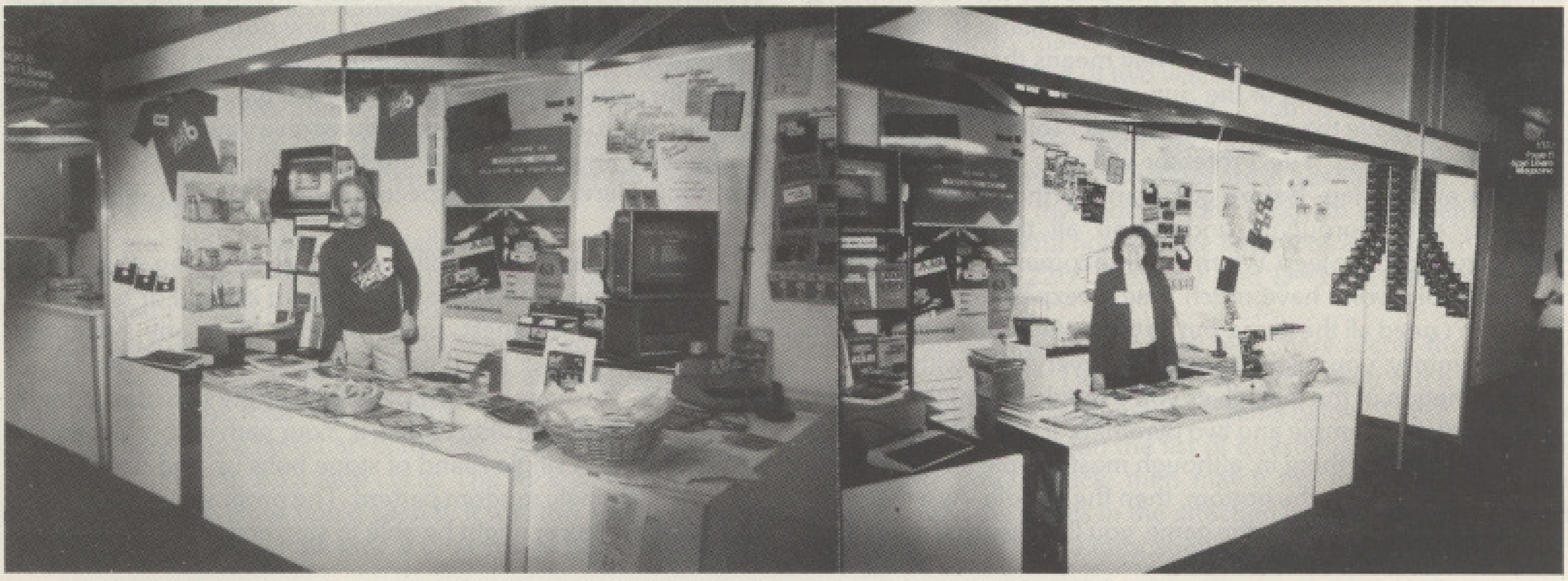
To be honest we were not going to publish any further updates to TYPO because we felt that any further revisions would only serve to confuse readers rather than help but when we saw TYPO 3 we just had to use it as our standard typing checker for all future issues. *TYPO 3 is completely compatible with TYPO II.*

The advantages of TYPO 3 are that it clears itself from memory as soon as it is run, it allows you to type listings in almost any fashion you wish and it is fast. And you can use it to check previously typed in listings.

The program listing is on page 17. Type it in now, it is well worth the effort, and you can also use it to check ANTIC programs.

TYPO 3 was written by Alec Benson and based on the original TYPO published by ANTIC magazine. TYPO 3 was first published in FEEDBACK, the newsletter of Adelaide Atari Computer Club, P.O. Box 333, Norwood, S.A. 5067, Australia.

LISTING on page 17



The PAGE 6 stand at the Personal Computer World Show with entire PAGE 6 staff in attendance!

10. MASK of the SUN



The Mask of the Sun is an illustrated Adventure that was originally written by Ultrasoft for the Apple II. It has now been translated for the Atari and is distributed by Broderbund. The Atari version occupies two double-sided disks. That's a lot of Adventure, but is it worth the money?

The Mask of the Sun has the potential to be a great Adventure. It has a strong plot cast in the same vein as 'Raiders of the Lost Ark' and 'Indianna Jones and the Temple of Doom', however, it is let down by the worst mazes and the unfairest puzzles in all of Adventuredom! Only the toughest, most hardened Adventurer will finish this one without any help.

In The Mask of the Sun, you play the part of Mac Steele - archeologist, adventurer and not particularly honest treasure hunter. Your arch rival, Francisco Roboff, has stolen the scrolls of Lhasa which you acquired in a previous expedition. In the subsequent fracas with Roboff, you return his gesture by stealing an Aztec amulet. During your later research on the amulet, you discover that it may be linked to a more fascinating artifact known as the Mask of the Sun.

Then disaster strikes. While probing the inner recesses of the amulet, a tiny compartment releases a pale green gas which knocks you out for two days. You awaken in hospital to find that your body is undergoing a rapid degeneration. Fortunately, the doctors have concocted an antidote which temporarily halts the degeneration, but they cannot cure you. With your life-giving antidote in hand, you set off to Mexico in search of the Mask of the Sun in the hope that it holds the cure for your condition.

Your Adventure begins as the plane arrives in Mexico. Unlike most Adventures, you begin with a rather large inventory including a bottle of 100 pills. Needless to say, the pills are the antidote for your strange illness and one is automatically swallowed every four moves. This is signalled by a beep from the computer. If you aren't carrying the pills on the fourth move, you'll die. Therefore, never drop the pills. Similarly, if you ever run out of pills, you'll die. This effectively means that you have 400 moves to find the Mask of the Sun.

When you leave the plane, you'll meet Professor de Perez and his assistant Raoul. The Professor will give you a jeep full of supplies and a map. Before going any further, make sure you examine and thoroughly understand all the items in your inventory and in the jeep. When the time comes to use something, you probably won't have much time to experiment with them. You won't need all the items, but as there seems to be no limit on your inventory, you might as well take everything with you.

Examination of the map gives you a rough idea of the location of three ruins - a temple and two pyramids. It doesn't matter what order you explore them in, although most people unconsciously do the top one, then the bottom, then the middle. As a matter of fact, by the time you finish the game, you'll realise that apart from a subtle hint, two of the ruins were an absolute waste of time in terms of your final goal. Nevertheless, these two are the most fun to explore. (And I won't tell you which ones they are. You'll have to find out for yourself.)

Once you've decided which direction to go, jump in the jeep and head off into the jungle. Raoul will accompany you and you'll grow quite fond of his companionship and dopey observations. It's unfortunate that he won't make it through to the end of the Adventure with you.

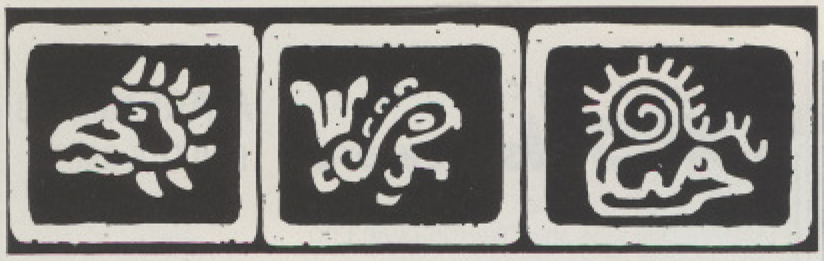
By this time, you will have noticed the 'travelling sequences' whenever you move to a new location. This is a unique feature of the game whereby several intermediate scenes are shown in rapid sequence to give the effect of movement. This is quite a novelty at first, but there are really only two different sequences (i.e. driving in the jeep and walking through the tunnels in the ruins) and it grows to be horribly boring before very long. I suppose the nice graphics are some consolation.

You will also discover that there are two directional schemes used in The Mask of the Sun. The first is the traditional compass directions (including diagonals) and is used when travelling in the jeep and in some of the ruins. The other scheme is FORWARD, BACK, LEFT and RIGHT and depends entirely on which direction you've just come from or which direction you're facing. This is generally used when on foot in the ruins. There is no consistency as to which system is used where, so make sure you try every direction whenever there's any doubt.

There are a number of situations where your typing speed is critical for your survival. You may need to type responses quickly to avoid death, but you can sometimes give yourself time to think by pressing any key to stop the timer. The snake is a notable exception. Here you must type the whole command as quickly as possible.

Sooner or later, you will find yourself facing the hellish nightmare scene. And very aptly named it is too! For here is the worst, meanest, rottenest, unfairest obstacle in any Adventure that I've ever played! For those that haven't reached this far, let me explain. You have just escaped death by the skin of your teeth. Unfortunately, Raoul didn't make it. Your path is now blocked by a river of lava. A single island of stone bobs up and down in the lava in a seemingly random pattern. The program tells you that a fearless Adventurer might be able to step across to safety. If you

by Garry Francis of Sydney, Australia



wish to try, you must press the RETURN key. Pressing any other key will send you back to the previous location where you will share Raoul's fate. In other words, you've got no choice. You must press the RETURN key to jump across the lava. And that's exactly what I did. And I died.

Now I considered myself a fearless Adventurer and I wasn't going to let some lava beat me, so I restored a previously saved game (which takes an eternity) and tried again. And again. And again. And again. After two hours and forty attempts to jump across the lava, I eventually gave up. A couple of months later, I lent the game to a friend with strict instructions to save the game as soon as he managed to get across the lava. He never made it. I tried it with a group of people at an Adventure day. They never made it. I tried it again by myself, but never made it. For me, this single arcade-type element had ruined an otherwise good Adventure.

In the end, I patiently examined the program with a sector editor and made some interesting discoveries. Each location in the game has its own logic routine which is stored on disk as a DOS2.0 file. If you've got DOS2.0, you can easily examine any of these files using the following procedure:

1. Insert your BASIC cartridge (if appropriate) and boot your computer with a DOS 2.0 disk. Note that it must be DOS 2.0. Nothing else will do.
2. When BASIC's READY prompt appears, type POKE 3822,255 [RETURN]. This will allow you to use inverse characters in step 6.
3. Type DOS [RETURN].
4. When DUP.SYS has loaded and the menu appears, remove your DOS 2.0 disk and insert one of The Mask of the Sun disks.
5. Type A [RETURN] [RETURN] to get a disk directory. Notice that all the filenames are in inverse.
6. You can now use the copy function to view a file on the screen by typing C [RETURN] FILENAME.EXT,E: [RETURN]. Make sure you type the filename and extender in inverse (including inverse blank spaces where necessary) and everything else as normal.

If you follow this procedure, you'll notice that the data files for rooms aren't binary data or machine language as you'd expect, but are in a sort of high level language and are therefore very easy to interpret. For example, if I use a double slash to separate the instructions, then the sequence .I D:0//.T S B=B+6 means "if the variable D equals zero, then set variable B to B+6". Similarly, the sequence .I Q#141//.T P "Chicken!'//.E J+17 means "if the variable Q is not equal to 141, then print the string 'Chicken!', else jump forward 17 instructions".

I soon realised that this was a really sloppily written Adventure. I was amazed that it ran as well as it did. Had it been written in a more elegant manner, it could probably have been fitted on one double-sided disk instead of two and hence been cheaper to buy. Nevertheless, the sloppiness proved to be an advantage when it came to fixing the rock bobbing logic.

When I drew up a flowchart of this logic, I realised that it wasn't random, but ran in a 13 step cycle. The rock was up only long enough to see it. Once you'd seen it, it was too late to press the RETURN key because the time it took you to react and depress

```
CS 1 REM ###########################################
AS 2 REM # MASK OF THE SUN FIXER-UPPER #
SA 3 REM #         by Garry Francis         #
JU 4 REM #          PAGE 6 Issue 18          #
CW 5 REM ###########################################
KM 100 POKE 82,1:POKE 83,39:GRAPHICS 0:PO
   KE 710,18:POKE 752,1
WL 110 DIM ML$(4),BUFFER$(128):FOR I=1 TO
    4:READ A:ML$(I)=CHR$(A):NEXT I:DATA 1
   04,76,83,228
AM 120 POSITION 7,1:? "INSTRUCTIONS FOR M
   ODIFYING":POSITION 10,2:? "THE MASK OF
    THE SUN"
PM 130 ? :? "1. Insert your backup copy o
   f The Mask    of the Sun side C into d
   rive 1."
CG 140 ? :? "2. Press RETURN to modify di
   sk or ESC      to abort.":POKE 82,2:? :
   ?
WR 150 POKE 764,255
DU 160 A=PEEK(764):IF A=255 THEN 160
MP 170 IF A=28 THEN POKE 82,2:GRAPHICS 0:
   END
DQ 180 IF A<>12 THEN 150
FN 190 BUFFER$(128)=" ":A=ADR(BUFFER$):HI
   =INT(A/256):LO=A-256*HI
GX 200 POKE 769,1:POKE 770,82:POKE 772,LO
   :POKE 773,HI:POKE 778,58:POKE 779,2:GO
   SUB 230
IV 210 IF BUFFER$(112,114)<>"R=0" THEN ?
   "YOUR DISK IS DIFFERENT TO MINE":? "OP
   ERATION ABORTED":GOTO 250
EF 220 BUFFER$(112,114)="D=1":POKE 770,87
   :GOSUB 230:? "OPERATION COMPLETE":GOTO
    250
GL 230 A=USR(ADR(ML$)):IF PEEK(771)=1 THE
   N RETURN
LG 240 POP :? "ERROR ";PEEK(771);"...OPER
   ATION ABORTED"
DT 250 POKE 752,0:POKE 764,255:END
```

the key was longer than the time the rock was visible on the screen. You'd have to be extremely lucky to predict the rock's position in advance.

I wanted to alter the logic so that pressing the RETURN key would always cause you to jump successfully across the lava regardless of the position of the rock. Everything else should remain unchanged. As it happened, working out the logic was quite easy, but working out where to put the patch without a major rewrite was quite tricky. In the end, I was saved by the sloppy coding. The programmers had set R=0 twice in the program, but it was never used for anything. The second R=0 was in an ideal spot for my patch, so I changed this to D=1 and everything worked fine.

If you want to make the same changes as I did, you can accomplish this in one of two ways. If you've got a sector editor, take a look at sector $23A on side C. Change byte $6F from $D2 to $C4 and byte $71 from $B0 to $B1 (assuming bytes are numbered from zero and all values are in hexadecimal). Alternatively, you can run the short BASIC program at the end of this article. Just be careful not to make any typos and be very careful with lines 210 and 220. The 'R=0' and 'D=1' on these lines must be in inverse video.

Once you've passed the hellish nightmare scene, the Adventure gets even harder. I won't give any more away, but if you need any help with this part, then try the hints below. These are in the normal format. Just scan the list of questions until you find the area where you're stuck, then match the numbers below the question with the words in the attached list to form a hint. Good luck and beware of the inescapable mazes!

Hints overleaf

MASK OF THE SUN hints

1. Can't get past the snake?
38 16

2. Still can't get past the snake?
14 27 71

3. Can't get past the debris in the blocked tunnel?
49 6

4. Can't find your way around the bottom of the pit?
76 39

5. Missing a carved jade bowl?
76 42 10

6. Missing a gold bowl?
76 42 17

7. Can't move the teetering boulder?
49 6

8. Missing a blue glazed bowl?
31 1 8

9. Can't get the silver bowl?
38 16

10. Still can't get the silver bowl?
58 42 41

11. Can't open the door between the pedestals?
14 24 75

12. Jeep won't go?
72 42 52

13. Can't get the flute?
40 42 22 36

14. Can't get the potion from the peddler?
9 15

15. Can't get past the spider web?
63 39

16. Can't unlock any of the doors in the pyramid of Tikal?
14 42 46 67

17. Can't find the black key?
76 42 56

18. Still can't unlock any of the doors?
14 42 23 67

19. Can't find the copper key?
31 1 8

20. Still can't unlock any of the doors?
14 42 44 67

21. Can't find the silver key?
76 42 4

22. Still can't unlock any of the doors?
14 42 47 67

23. Can't find the gold key?
76 42 43

24. Don't understand the reflections?
65 40 73 70

25. Still don't understand the reflections?
31 28 27 61 48 46 5 59 27 61 48 68 5

26. Can't survive the pale green gas?
38 16

27. Still can't survive the pale green gas?
14 69 53

28. Can't save Raoul?
49 6

29. Can't jump across the lava?
20 42 11

30. Can't find the exit from the area of total darkness?
14 60

31. Can't map the first maze?
65 8 50

32. Don't know the password?
30 42 52 2

33. Can't leave the temple of the sun?
9 42 51

34. Still can't leave the temple of the sun?
30 42 25 2

35. Still can't leave the temple of the sun?
29 42 61 48 42 68 5

36. Can't answer the first riddle?
42 3 28 27 19 33 42 55 37 39 73 42 13 33 42 13 28 45

37. Still can't answer the first riddle?
65 27 21 7 73 26 42 45

38. Can't answer the second riddle?
74 42 32 54 39

39. Still can't answer the second riddle?
65 35 59 64

40. Can't answer the third riddle?
18 28 77 12 66

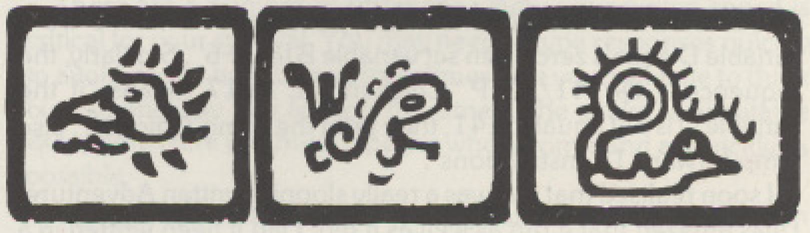
41. Still can't answer the third riddle?
34 28 22 62

42. Can't get to freedom?
65 27 57

43. Can't map the third maze?
29 42 61

44. Can't get past the jaguar?
30 42 22 36 2

1 ISN'T	12 AFTER	23 COPPER	34 EVENING	45 DEAD	56 BLOCK	67 KEY
2 ?	13 USER	24 INTERIOR	35 HOT	46 BLACK	57 MIRAGE	68 BLUE
3 MAKER	14 TRY	25 REFLECTIONS	36 WOMAN	47 GOLD	58 ASK	69 EVERY
4 FLOOR	15 HIM	26 BURYING	37 BUYS	48 WITH	59 AND	70 LATER
5 EYES	16 FAST	27 A	38 TYPE	49 YOU	60 AGAIN	71 WEAPON
6 CAN'T	17 CRYPT	28 IS	39 IT	50 ROOM	61 MASK	72 FIX
7 BOX	18 MORNING	29 WEAR	40 HELP	51 ALTAR	62 AGE	73 FOR
8 ONE	19 CARPENTER	30 REMEMBER	41 APPARITION	52 IDOL	63 CUT	74 SMOKEY
9 EXAMINE	20 READ	31 THERE	42 THE	53 DIRECTION	64 BURNS	75 DECORATING
10 PLATFORM	21 WOODEN	32 BEAR	43 DOORS	54 PREVENTS	65 IT'S	76 SEARCH
11 ARTICLE	22 OLD	33 .	44 SILVER	55 BUYER	66 BIRTH	77 JUST





ATARI ST

520 ST

POWER WITHOUT THE PRICE

THE NEW ATARI 520ST

Under the new leadership of Jack Tramiel (former boss and founder of Commodore Business Machines), Atari Corporation have marked their entry into the world of business/personal computers with a machine which leaves the competition standing. Tramiel's slogan 'Power Without the Price' has been implemented in the manufacture of the new 512K Atari 520ST colour computer which offers the user amazingly high performance at an incredibly low price. Launched as a work-station, this new system incorporates seven software packages as well as the 520ST computer with 512K RAM, mouse controller, high resolution monochrome monitor (640x400), 95 key keyboard (with 18 key numeric keypad), MIDI interface, GEM and a 500K 3½ inch disk drive, all for the package price of only £651.30 (+VAT = £749). Dubbed the 'Mac beater' and the 'Jackintosh' (after Atari's Chief, Jack Tramiel), Atari's new machine has been directly compared with the Apple Macintosh RRP £2595 (+VAT = £2985) which offers similar features and capabilities but at a much higher price. Favourably reviewed by the UK's highly critical specialist computer press, the 520ST is likely to make a great impact in this country as a sophisticated alternative to an IBM PC, APRICOT or APPLE MACINTOSH. Unlike its overpriced competitors, the Atari 520ST can be linked up to a colour monitor to unleash a choice of up to 512 colours. The addition of colour brings out the full potential of graphics packages such as GEM.

USER FRIENDLY GEM OPERATING SYSTEM

The power of the ST is harnessed and made user friendly by the new operating system 'GEM' from Digital Research. GEM stands for Graphics Environment Manager and allows a user friendly colour or B/W graphics interface which closely resembles that of the Macintosh. This similarity extends to the use of moveable resizeable windows, icons to represent objects such as disks and disk drives, and the use of pull down menus and a mouse. The advantage of all this is that the computer becomes extremely easy to use. GEM has now been implemented for the Acorn, ACT, Atari, IBM, ICL, and Olivetti. Software written for GEM on one computer should also run under GEM on another computer. This will enable the market to quickly produce a large library of standard interchangeable software.

FREE SOFTWARE AND FUTURE EXPANSION

The Atari 520ST comes supplied with seven free software packages as listed below: 1) TOS -Tramiel Operating System based on CPM 68K. 2) GEM Graphics Environment Manager by Digital Research (DR) giving a WIMP (Window, Icon, Mouse, Pull down menu) environment. 3) DR GEM Paint for creating graphics masterpieces. 4) DR GEM Write for word processing. 5) Logo learning language to enable you to write your own programs easily using turtle graphics. 6) DR Personal Basic a powerful user friendly version of the Basic programming language. 7) BOS operating system giving you access to dozens of business applications packages already available on the market. Designed with future expansion in mind, the ST also features a host of different interfaces to the outside world and an impressive list of accessories is planned. Atari will soon be releasing a 1000K (1MB) 3½ inch disk drive, and a 15MB hard disk storage system as well as a mass storage compact disk (CD) player capable of storing an entire 20 volume encyclopedia on one disk. A full range of inexpensive printers are planned including dot matrix, daisywheel and thermal colour printers. With its unbeatable graphics, speed and software at a price which is far below that of any comparable personal computer currently on the market, the ST is all set to do battle with the competition. To receive further details of the ST from Silica Shop, just fill in the coupon below with your name and address details and post it to us.

Silica Shop Price: £651.30 + £97.70 VAT = £749.00 This price includes:

- ★ **512K RAM**
- ★ **MOUSE**
- ★ **GEM**
- ★ **B/W MONITOR**
- ★ **500K 3.5" DISK DRIVE**
- ★ **KEYBOARD (95 KEYS)**

£749

ATARI 520ST SPECIFICATION

MEMORY
512K RAM (524,288 bytes)
16K ROM expandable to 320K
Port for addnl 128K plug-in ROM cartridges
200K TOS operating system

GRAPHICS
Individually addressable 32K bit-mapped screen with 3 screen graphics modes:
320x200 pixels in 16 colours (low resolution)
640x200 pixels in 4 colours (med resolution)
640x400 pixels in monochrome (high res)
16 shades of grey in low res mode
512 colours available in low/medium res
8 levels of each in red, green and blue

ARCHITECTURE
4 custom designed chips:
GLUE Chip - MMU Memory Mngmnt Unit
DMA Controller - Graphics Processing Unit
16/32 bit Motorola 68000 processor at 8MHz
eight 32 bit data registers
eight 32 bit address registers
16 bit data bus/24 bit address bus
7 levels of interrupts/56 instructions
14 addressing modes/5 data types

DATA STORAGE
High speed hard disk interface
Direct memory access 1.33 Mbytes per second
CD (Compact Disc) interface
Built in cartridge access
Dedicated floppy disk controller

DISK DRIVE
500K (unformatted) s/sided 3½" floppy d/drive
349K (formatted) storage capacity

SOUND AND MUSIC
Sound Generator
Frequency control from 30Hz to above audible
3 voices (channels) in wave shaping sound in addition to a noise generator
Separate frequency and volume controls
Dynamic envelope controls
ADSR (Attack, Decay, Sustain, Release)
Noise generator
MIDI interface for external music synthesizers

KEYBOARD
Separate keyboard microprocessor
Standard QWERTY typewriter styling
Ergonomic angle and height
95 keys including 10 function keys
Numeric keypad — 18 keys including ENTER
One touch cursor control keypad

MONITOR
12" screen - high res monochrome monitor
640x400 monochrome resolution

VIDEO PORTS
Display - Low Resolution - 40 columns
Med/High Res - 40/80 plus cols
Medium res RGB (Red/Green/Blue) output
High resolution monochrome (Black & White)

COMMUNICATIONS
Bidirectional centronics parallel interface for printers, or modems capable of input/output
RS232C serial modem/printer interface
VT52 Terminal Emulation Software
Maximum Baud Rate up to 19,200
High speed hard disk interface
Floppy disk controller (Western Digital)
2 joystick ports (one for 2 button mouse)
MIDI interface for external music synthesizers

GEM WIMP ENVIRONMENT
WIMP - Window Icon Mouse Pop-down menus
Two button mouse controller
Icons/Pull down menus/Windows
GEM VDI - Virtual Device Interface
GEM AES - Application Environment Services
GEM BBT - Bit Block Transfer
Real time clock & calendar

SOFTWARE
GEM environment
with user friendly Macintosh style operation
'TOS' - Tramiel Operating System
Atari's own system based on CP/M 68K with hierarchical directory & file structure plus a host of MS DOS & UNIX command structures
'BOS' - Business Operating System
to run any standard BOS business programs
GEM desktop
with GEM PAINT graphics mgmt system and GEM WRITE word processor
Personal BASIC and DR Logo
originally written by Digital Research (DR) Very much like those on other machines except for the extensive use of pull down menus, mouse control and windows

VARIOUS
Dimensions: 470mmx240mmx60mm
Replaceable external power supplies
Expansion: 3½" floppy disk drives 500K/1,000K (two drives can be connected)
3½" 15Mb hard disk
CD (compact laser disc)
Dot matrix & d/wheel prntrs (black)
Thermal dot matrix (colour)
RGB & monochrome monitors

LANGUAGES
BASIC & LOGO supplied
Many others will soon be available, including: Assembler, BCPL, C, Cobol, Compiled Basic Lisp, Modular-2 and Pascal

Note: Some of the above specifications are pre-release and may therefore be subject to change

MACINTOSH v F1e v 520ST

"Imagine a Fat Mac - the 512K Apple Macintosh - but with a bigger screen, a far bigger keyboard with numeric keypad, cursor and function keys, and colour. That gives you some idea of what the Atari 520ST is like, except for two important things. First the Atari seems faster. Second the Atari system is about one third of the price."
June 1985 - Jack Schofield - **PRACTICAL COMPUTING**

FEATURES OF BASIC SYSTEM	APPLE MACINTOSH	APRICOT F1e	ATARI 520ST
Price Includes B/W Monitor	YES	NO - extra £200	YES
Keyboard size mm (LxDxH)	330x147x50	450x167x28	470x240x60
Keyboard size ins (LxDxH)	13x5⅞x2	17½x6½x1	18½x9½x2½
3½" D/Drive (Unformatted)	500K	500K	500K
3½" D/Drive (Formatted)	399K	315K	349K
WIMP (Window, Icon, Mouse ...)	Apple	ACT - Activity	GEM
Real-time Clock	YES	YES	YES
Polyphonic Sound Generator	YES	NO	YES
RS232 Serial Port	YES	YES	YES
Centronics Parallel Printer Port	NO	YES	YES
Dedicated Floppy Disk Controller	NO	YES	YES
Hard Disk DMA Interface	NO	YES	YES
Full stroke keyboard	YES	YES	YES
Number of keys on keyboard	59	92	95
Numeric Keypad	NO	YES (16 Keys)	YES (18 keys)
Cursor Control Keypad	NO	YES	YES
Function keys	NO	10	10
16-bit processor	68000	Intel 8086	68000
Processor running speed	8MHz	4.77MHz	8MHz
RAM size	512K	256K	512K
Number of graphics modes	1	4	3
Number of colours	Monochrome	16	512
Max Screen Resolution (pixels)	512 x 342	640 x 256	640 x 400
Mouse included	Single Button	NO - extra £95	Two Button
Replaceable External Power Pack	NO	NO	YES
Cartridge Socket	NO	NO	YES
Joystick Ports	NO	NO	YES (two)
MIDI Synthesiser Interface	NO	NO	YES
Monitor Size	9"	9" - extra £200	12"
RGB Video Output	NO	YES	YES

System Cost with: Mouse - Monochrome Monitor - 512K RAM - 500K Disk Drive

Price of basic system (exc VAT)	£2595+VAT	£595+VAT	£652+VAT
+ Mouse	Included	£95+VAT	Included
+ Monochrome Monitor	Included	£200+VAT	Included
+ Expansion to 512K RAM	Included	£295+VAT	Included
Price of complete system (exc VAT)	£2595+VAT	£1185+VAT	£652+VAT
PRICE rounded down including VAT	**£2,984**	**£1,362**	**£749**

PRESS COMMENT

"Atari's new corporate image as an aggressive low cost computer maker is likely to mirror that of Commodore where Mr. Tramiel established the maxim that 'Business is war'."
August 21st 1984 **FINANCIAL TIMES**

"This is the only personal computer I know of that comes with a Midi interface as standard."
Peter Bright March 1985 **PERSONAL COMPUTER WORLD**

"The (GEM) version running on the Atari 68000 machines will have the additional advantage of leaving the PC version standing." April 6th 1985 **PERSONAL COMPUTER NEWS**

"It would seem that GEM offers the ideal operating system."
March 7th 1985 **POPULAR COMPUTING WEEKLY**

"I found it (GEM) extremely easy to use and was very impressed with the way in which it disguises the unfriendly hardware and operating systems lurking under the surface."
Peter Bright Feb 1985 **PERSONAL COMPUTER WORLD**

"The electronics in the machine are a work of art ... The heart of the 520ST is a Motorola 68000, one of the most powerful 16-bit processors around and in many respects it is close to being a 32-bit chip ... when the machine appears in the shops, I'll be at the front end of the queue to buy one."
Peter Bright June 1985 **PERSONAL COMPUTER WORLD**

"This machine is significantly more powerful than an IBM PC ... If it's possible to design a sure-fire winning machine, this is it." May 11th 1985 **PERSONAL COMPUTER NEWS**

"... the use of GEM makes the new range of Atari computers so similar to the Macintosh (with the added attraction of colour), that they are already being called 'Jackintoshes'."
May 2nd 1985 **COMPUTING**

"The new Atari ST computers truly represent to the consumer what Jack Tramiel is saying — easy-to-use computing power without the price." March 1985 **ANALOG COMPUTING**

"It (the ST) uses the most modern technology that is affordable, in a package that gives a professional impression."
May 23rd 1985 **POPULAR COMPUTING WEEKLY**

"The Atari ST is one of the most elegant designs I have seen ... Atari has used an original and elegant method of memory management which should make the ST faster than any other PC on the market - in any price bracket ... The 64K dollar question is would I go out and spend money for one? To which the only answer is 'Try and stop me!'"
John Lambert July 1985 **ELECTRONICS & COMPUTING**

"The 520ST is technically excellent ... The 520ST hardware is the new standard by which others will be judged."
July 1985 **YOUR COMPUTER**

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ON THE NEW ATARI 520ST COMPUTER

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Address: ....

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.... Postcode: ....

Do you already own a computer
If so, which one do you own? ....

Book Reviews

MAPPING THE ATARI - REVISED EDITION
COMPUTE! Books
£16.95

Above all else the one thing XL programmers have been crying out for is a memory map for the XL series. It has been a long wait but COMPUTE! have finally come up with a revised version of the classic Mapping The Atari which includes not only the XL and the XE but also throws in a few more hidden gems about the old machines!

Reviewing the book for new XL or XE owners is simple. If you want to be able to program your machine, buy this book, it cannot be recommended highly enough. What you get is a detailed description of almost every memory location you are likely to need to know about with many programming examples and useful routines. If you program in BASIC, your programs will have added polish and scope with this book to hand and if you want to learn machine code a memory map is *essential*. You may as well not bother without one! But you get much more than just a memory map for the introduction tells you quite a lot about the fundementals of programming and there are no less than *nineteen* appendices covering almost every aspect of your machine and including specific chapters on XL/XE enhancements and bugs, XE memory management, DOS 2.5, XL/XE graphics modes and more.

There is a section using the Translator to get a customised Operating System for your machine and you also get a type in program that converts the XL Revision B BASIC to Revision C which alone could save you the price of the book!

What if you already have the original version of Mapping? Well, that is more difficult. This one is more expensive at £16.95 and the vast majority is the same. It depends on how you value all those little gems you picked up from the first edition. There is an Addenda and Errata to the First Edition which was a great thrill to read (I didn't know *that*!) and there is certainly more information overall. In the long run those few extra programming tips might be worth more than £16.95 spent on some game you put away after a few plays.

Two hundred and seventy pages of good, solid, hardcore *knowledge*. What more could you want?

The Letters column has been held over this issue for two reasons - lack of space and lack of interesting letters!

Why not write to us with any observations, tips or questions that may be of interest to other readers? Address your letters to READER'S WRITE, PAGE 6 Magazine, P.O.Box 54, STAFFORD, ST16 1DR.

Let's hear from you!

SPEEDSCRIPT
COMPUTE! Books
£9.95



Speedscript was a professional quality word processor published a while ago in COMPUTE! and this book is basically a repeat of the article and program listing with a complete source code and much previously unpublished information.

At first sight it might seem strange to produce a book about a magazine program but Speedscript is probably one of the most comprehensive and professional programs ever published in a magazine and is certainly the cheapest full-feature word processor you are ever likely to come across. Good word processors are expensive and you may find that the one you buy doesn't suit you. At least with this book you can introduce yourself to word processing with the minimum outlay and even if you find that the program doesn't suit you you will be better armed to find one that does.

Word processing is one of the few tasks that a computer can do for everyone and if you have not dipped your toe in the water, try it, you will not find a cheaper way! ●

How to Type in the Listings

and get them right!

The program listings in PAGE 6 are prepared carefully to ensure that they can be typed in as easily as possible. Before typing any listings ensure that you are familiar with the use of the Shift and CONTROL and INVERSE keys as outlined in your computer manual. The listings are prepared to match exactly what you see on screen. Every character that you may see in a listing is included in the chart below for cross reference. By using TYPO 3 you can ensure that you type in the programs EXACTLY as they are printed. Remember a single typing mistake may mean a program will not run.

WHAT ARE THOSE CODES?

Each line of a program begins with a special two letter code. THESE SHOULD NOT BE TYPED IN. They are used by the program TYPO to check that you have typed each line correctly. IF YOU HAVE NOT ALREADY TYPED IN THE TYPO 3 LISTING PLEASE DO SO NOW. The program can be used as you type in each line of a program or to check an already typed program. The code for each line will match but if you have problems check the listing conventions below carefully, you are most probably typing a CONTROL character incorrectly. TYPO 3 cannot check if a line has been missed so if you have problems in running a listing count the lines in the program and ensure none are missing. If the TYPO codes match and the program still does not run, LIST it to cassette or disk using LIST "C:" or LIST "D:filename", switch off the computer, re-boot and then ENTER the program using ENTER "C:" or ENTER "D:filename". Save this version in the normal way.

HOW TO USE TYPO 3

1. Type in the listing carefully for although you can use TYPO 3 to check itself (see 6 below) it may not work if you have made mistakes.

2. SAVE or CSAVE a copy of the program.

3. Each time you want to type in a program listing RUN TYPO 3 *first*. The program will install a machine code routine in memory and then delete itself. Now type in a line as shown in the magazine *excluding the first two letter code* and press RETURN.

4. A two letter code will appear at the top left of your screen. If this code matches the one in the magazine carry on and type the next line. Note, the code will not match if you use abbreviations. If you prefer to use abbreviations LIST the line you have just typed, move the cursor to that line and press RETURN. The code should now match.

5. If the code does not match, use the editing keys to correct the line and press RETURN again. Repeat if necessary until the codes match.

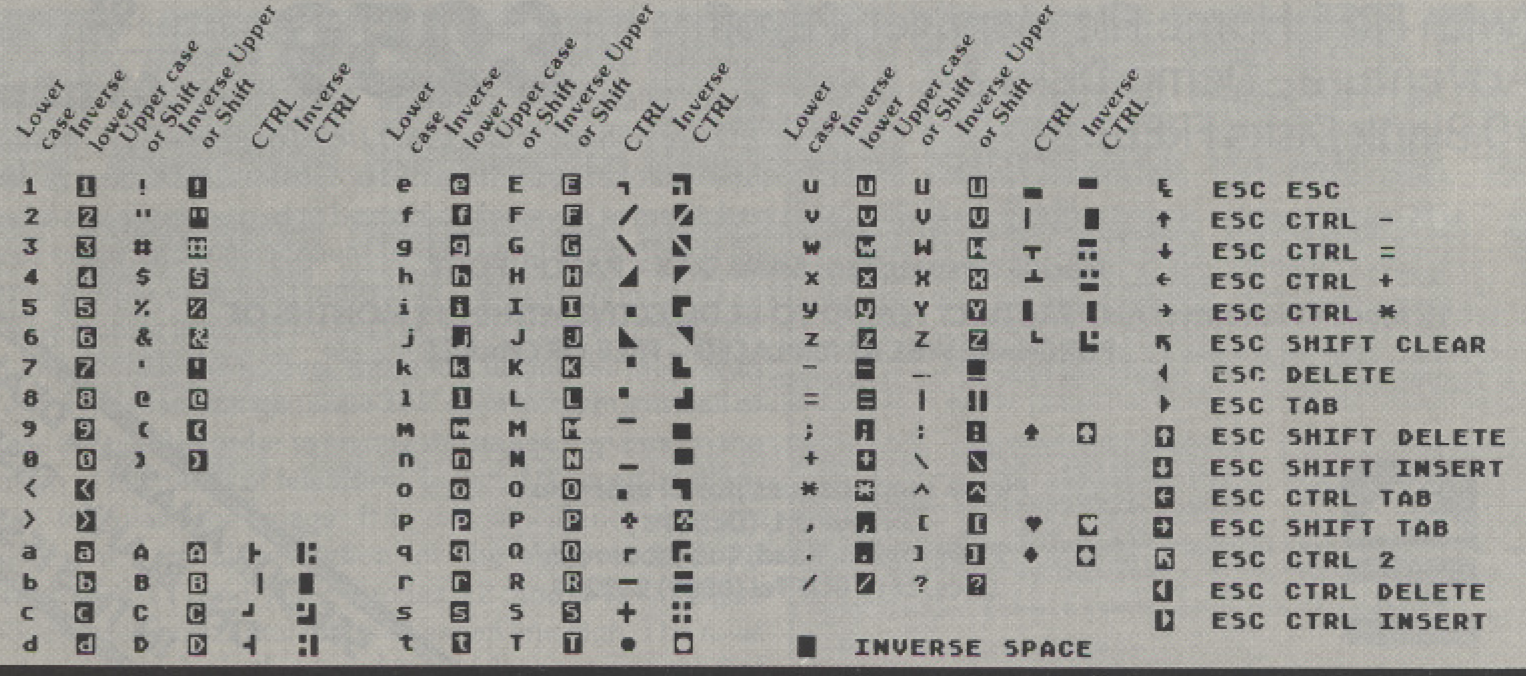
6. To check a line you have already typed LIST the line, place the cursor on that line and press RETURN.

7. When you have finished a listing just SAVE or CSAVE it in the normal way.

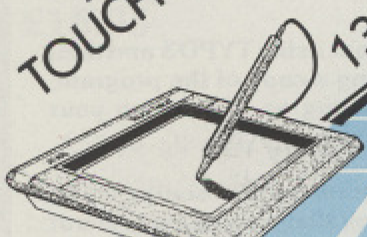
You can type in a program without using TYPO 3 and then check it by SAVEing or CSAVEing a copy of the program, running TYPO 3 and then LOADing or CLOADing your program and proceeding as in step 6 above.

Always SAVE or CSAVE a program before running it and always use TYPO before telling us that a program will not run.

```
EI 1 REM ********************************
AL 2 REM *  TYPO III by Alec Benson     *
         *          June 1985           *
SA 3 REM * A proofreader for ANTIC and *
         *   PAGE 6 based on TYPO II    *
         * published by ANTIC magazine *
EL 4 REM ********************************
SG 100 GRAPHICS 0
WG 110 FOR I=1536 TO 1791:READ A:CK=CK+A:
   POKE I,A:NEXT I
CG 120 IF CK<>30765 THEN ? "Error in DATA
    statements - Check Typing":END
YM 130 A=USR(1536)
VT 140 ? :? "TYPO III is up and running":
   NEW
MA 1000 DATA 104,160,0,105,26,3,201,69
HG 1010 DATA 240,8,200,200,200,192,36,208
QB 1020 DATA 242,96,200,169,79,153,26,3
RK 1030 DATA 200,169,6,153,26,3,162,0
RR 1040 DATA 189,0,228,157,79,6,232,224
TO 1050 DATA 15,208,245,169,93,141,83,6
KC 1060 DATA 169,6,141,84,6,173,4,228
EU 1070 DATA 105,0,141,95,6,173,5,228
BK 1080 DATA 105,0,141,96,6,169,0,162
KK 1090 DATA 3,149,203,202,16,251,96,0
ZR 1100 DATA 0,0,0,0,0,0,0,0
LD 1110 DATA 0,0,0,0,0,0,32,94
JM 1120 DATA 6,8,72,201,155,240,55,230
TV 1130 DATA 203,133,209,138,72,169,0,133
TW 1140 DATA 208,162,8,10,38,208,6,209
MF 1150 DATA 144,7,24,101,203,144,2,230
RL 1160 DATA 208,202,208,239,133,207,24,1
   65
TM 1170 DATA 204,101,207,133,204,165,205,
   101
AW 1180 DATA 208,133,205,165,206,105,0,13
   3
XH 1190 DATA 206,104,170,104,40,96,138,72
NR 1200 DATA 152,72,162,0,134,207,134,208
GF 1210 DATA 160,24,6,204,38,205,38,206
EA 1220 DATA 38,207,38,208,56,165,207,233
TM 1230 DATA 164,170,165,208,233,2,144,4
SK 1240 DATA 134,207,133,208,136,208,227,
   162
CB 1250 DATA 8,165,207,133,204,165,208,6
XN 1260 DATA 204,42,201,26,144,4,233,26
MB 1270 DATA 230,204,202,208,242,133,205,
   169
BC 1280 DATA 128,145,88,200,192,40,208,24
   9
WV 1290 DATA 165,204,105,160,160,3,145,88
QA 1300 DATA 165,205,24,105,161,200,145,8
   8
MQ 1310 DATA 32,69,6,104,160,76,153,6
```



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DISPLAY LISTS PT.1

A tutorial by Steve Pedler

Many of the superb graphic displays of which we all know the Atari is capable depend on altering a set of instructions in RAM called the display list. This article is devoted to the display list (DL) and how to modify it for our own purposes. The article contains a number of demonstration programs which are explained in the text and in REM statements in the program itself. When typing them in, always type in the lines with REMs in them (at least the line number plus REM, if not the whole line) as in some cases these lines are used for GOTO and GOSUB statements. I would recommend that when reading the article the program listings are studied along with the text.

THE TV-SCREEN DIPLAY

Virtually every display list article I have ever seen starts off with a discussion of how the TV display is produced. This one is no exception, so those readers who already know how this works can skip to the next section.

An image is produced on a television screen by a stream of electrons which strike a phosphor coated surface causing it to glow. The electron beam starts from the top left-hand corner of the screen and moves horizontally from left to right. When it reaches the right-hand edge, it is switched off, moved back to the left side and down a fraction (this is the 'horizontal blank' period). It is then switched back on and the process repeated, until the beam reaches the bottom right-hand corner of the screen. At that point, it is switched off and brought back to the start position. Thus, the screen image is continually being redrawn (or 'refreshed') - 50 times per second in the UK PAL system. This is much too fast for the eye to follow and the image appears to us to be stable. However, some flicker does occur and may account for the eyestrain suffered by some people after long periods at their machine.

The picture is therefore built up from a stack of horizontal lines across the screen, these are usually termed 'scan lines'. The Atari can generate 262 scan lines, but not all of these are used in order to ensure the image appears on the screen of all makes of television. In fact, 192 scan lines are used to create the image. It is no coincidence that the maximum vertical resolution of the Atari is 192 (in Graphics 8-11 and Antic modes 12 and 14). In these modes, each horizontal row is one scan line high. The rows (or 'mode lines') of other graphics modes are composed of more than one scan line (e.g. one mode line of Graphics 0 is eight scan lines high). Table 1 shows how the mode lines of each graphics mode are made up, plus the resolution and memory requirements for each mode.

The fundamental unit of horizontal measurement on the screen is the colour clock. This is actually a hardware limitation in that a colour clock is the length of the smallest possible dot on the screen whose colour can be controlled independently of adjacent dots. The Atari can display a screen 228 colour clocks wide, but only 160 of these are used on a normal screen to ensure the sides of the picture are not cut off on the television. (Although this produces a border at each side, at least the care taken by the Atari's designers ensures the machine will work with virtually any TV - unlike some inferior machines, which won't.)

The machine can also light each half of a colour clock independently, producing a maximum horizontal resolution of 160 x 2 = 320 points, although this sacrifices additional

Table 1: The ATARI Graphics modes

BASIC mode	ANTIC mode	Resolution (max.)	Colours	Scan lines/ mode lines	Bytes/ line	Memory	Type
0	2	40 x 24	1	8	40	960	T
-	3	40 x 19	1	10	40	760	T
12	4	40 x 24	5	8	40	960	T
13	5	40 x 12	5	16	40	480	T
1	6	20 x 24	5	8	20	480	T
2	7	20 x 12	5	16	20	240	T
3	8	40 x 24	4	8	10	240	G
4	9	80 x 48	2	2	10	480	G
5	10	80 x 48	4	4	20	960	G
6	11	160 x 96	2	2	20	1920	G
14	12	160 x 192	2	1	20	3840	G
7	13	160 x 96	4	2	40	3840	G
15	14	160 x 192	4	1	40	7680	G
8	15	320 x 192	1	1	40	7680	G
9-11	15	80 x 192	var.	1	40	7680	GTIA modes

Notes

1) GTIA modes have identical DLs to Graphics 8

2) Total memory requirements shown are for full-screen modes (no text window) without any added unused bytes or for the DL. See 'Mapping the ATARI' pp. 17-21.

3) BASIC modes 12-15 are not available on the 400/800 series.

4) T=Text mode, G=Graphics mode.

colour for the reasons given above. Incidentally, a pixel (picture element) is the basic graphics unit which varies in size from one mode to another. In text modes, one pixel is usually taken to mean one character, although the individual dots making up each character are also sometimes called pixels - very confusing!

THE ANTIC CHIP

Discussion of TV screen displays is all very well, but what has this to do with the display list? Well, the TV display is under control of a separate microchip inside the Atari called Antic. Being a separate microprocessor, it needs a program to run it, which is in fact the purpose of the DL. The Display List is located in RAM, although its exact location depends on the graphics mode in use and the amount of memory installed in your machine. The Atari therefore has a pointer to the first byte of the DL at locations 560 and 561. The start of the DL is stored here in LSB/MSB format, so that in BASIC the start can be found by:

DL=PEEK(560)+256*PEEK(561)

Before we go on, take a look at Table 2. This contains some additional important memory locations I shall be referring to in this article.

At this point, type in and run Listing 1. I suggest you save this program, as it will allow you to examine the DL for any Graphics mode. The program will ask if you want a printout as well as screen display. Type the letter N if you don't have a printer. As an example, on being asked which mode type '1' and press RETURN. After a second or two, you should see something like this:

Display List for Graphics 1
112,112,112,70,128,157,6,6,6,6,6,6,6,6,6,6,6,6,6,6,
6,6,6,6,66,96,159,2,2,2,65,94,157

This is the DL for Graphics 1. Some of the numbers may be different in your machine. These are memory locations which depend on the amount of memory fitted in your computer. Let us now examine the meaning of the various numbers present in this DL.

The first three numbers are 112 (decimal). Each 112 is an instruction to Antic to leave eight blank scan lines, making a total of 24 blank lines at the top of the screen. No data can be displayed on these lines, which take the border colour as default.

Why put blank lines there at all? This is to prevent picture cutoff or 'overscan' at the top of the screen. To see this, press Break and then type in direct mode:

DL=PEEK(560)+256*PEEK(561): POKE DL,0: POKE DL+1,0: POKE DL+2,0

You will see the picture move up, and on some TVs the top may actually be cut off. What this means is that when designing your own DLs, you should always start with 24 blank lines. However, you can display less than 24 if absolutely necessary. Table 3 shows the instructions needed to display from one to eight blank lines.

Table 2: Summary of memory locations

Location	Name	Description
88,89	SAVMSC	Location of the first byte of screen memory in low and high byte format (i.e. SCREENMEM=PEEK (88)+256*PEEK(89)). The first byte is displayed in the top left-hand corner of the screen.
87	DINDEX	Contains the current Graphics mode number (the BASIC/O.S. number, not the Antic number).
660,661	TXTMSC	Identical to 88 and 89, but for the text window memory area.
659	TINDEX	Identical to 87 for the text window.
560,561	SDLSTL	Location of the first byte of the Display List in low and high byte format. Change these locations to point to your own DL if you set up a new one elsewhere in memory.
512,513	VDSLST	Location of the first byte of a DLI service routine in low and high byte format.
559	SDMCTL	Direct Memory Access Control. Controls playfield width and Player-missile graphics enabling. POKEing with zero turns off Antic; POKE with 34 (or press System Reset) to turn it back on with a standard width playfield and no PMG.
54276	HSCROL	Horizontal fine scroll register. Will fine scroll up to 16 colour clocks horizontally; bit four of the display list mode line instruction must be set to enable this register (add 16).
54277	VSCROL	Vertical fine scroll register, scrolls up to 16 scan lines vertically. Bit five of the DL mode line code must be set (add 32).
106	RAMTOP	Top of useable RAM (in pages) in the computer. Can be user-altered to reserve space for character sets, Player-missile graphics, etc. Initialised to 160 in a 48K system.

```
LG 10 REM  Display List Examiner 
JJ 20 REM  By S.J. Pedler  1985 
NT 30 CLR :GRAPHICS 0:? :? "Which Graphic
   s mode to examine";:INPUT MODE
WL 40 GRAPHICS MODE:POKE 559,0:DL=PEEK(56
   0)+256*PEEK(561)
UG 50 FLAG=0:J=0:DIM DL$(250),A$(1)
UU 60 DL$(J+1,J+1)=CHR$(PEEK(DL+J)):IF PE
   EK(DL+J)=65 THEN 80
BJ 70 J=J+1:GOTO 60
VY 80 J=J+1:DL$(J+1,J+1)=CHR$(PEEK(DL+J))
   :J=J+1:DL$(J+1,J+1)=CHR$(PEEK(DL+J))
LX 90 GRAPHICS 0
PP 100 ? "Output to printer [Y/N]";:INPUT
    A$:? :?
PL 110 IF A$="Y" THEN FLAG=1:POKE 838,PEE
   K(58422):POKE 839,PEEK(58423):TRAP 190
EK 120 ? "Display List for Graphics ";MOD
   E:? :?
IM 130 FOR J=1 TO LEN(DL$):? ASC(DL$(J,J)
   );",";:NEXT J:? :? :IF FLAG=0 THEN 150
TC 140 FLAG=0:POKE 838,PEEK(58374):POKE 8
   39,PEEK(58375):GOTO 130
DJ 150 ? :? "Another mode [Y/N]";:INPUT A
   $
WE 160 IF A$="Y" THEN GOTO 30
LR 170 IF A$<>"N" THEN 150
KW 180 GRAPHICS 0:END
IB 190 POKE 838,PEEK(58374):POKE 839,PEEK
   (58375)
JC 200 IF PEEK(195)=138 THEN ? :? "Print
   er not ready!!":? "Press  RETURN ";:IN
   PUT A$:TRAP 190:GOTO 30
HP 210 ? :? "Error-";PEEK(195):END
```

Listing 1

You are not restricted to putting blank lines at the top of the screen. Listing 3 below shows how blanks can also be used in the middle of the DL. This program is explained more fully below.

The next number (70) is one of the most important in the DL. It is in fact made up of two instructions: 64 (Load Memory Scan) plus 6 (Graphics Mode 1 instruction - see Table 1). The LMS instruction is a very simple one in spite of its name, since its function is to tell Antic the location of the first byte of memory to be displayed on the screen. The LMS code should always be present added to the code for one mode line of one of the various graphics modes. If this is not done, blank scan lines will be displayed instead. In addition, the LMS code must always be followed by two bytes (128 and 157 in the above DL - this may vary in your machine). These two bytes are the location, in conventional low- and high-byte format of the start of display memory, and unless deliberately altered will be the same as in locations 88 and 89. By altering just these two bytes, you can cause your Atari to display the contents of any area of memory on the screen! Would you like to see what is happening in the very low RAM area? Type:

DL=PEEK(560)+PEEK(561)*256: POKE DL+4,0: POKE DL+5,0

Table 3: Blank line instructions

Instruction code	Number of blank lines
0	1
16	2
32	3
48	4
64	5
80	6
96	7
112	8

```
RY 10 REM Text Window in Graphics 1
RM 20 GRAPHICS 8:DL=PEEK(560)+256*PEEK(56
   1)
EW 30 POKE DL+167,70:FOR J=170 TO 172:POK
   E DL+J,6:NEXT J
IQ 40 POKE 659,1
TQ 50 ? "TeXt WiNdOw In":? "GrApHiCs 1"
```

Listing 2

```
PE 10 REM Insertion of blank lines in the
NU 20 REM Display List
PH 30 REM Set up the new DL
MJ 40 FOR J=1 TO 49:READ X:POKE 1535+J,X:
   NEXT J
QK 50 DATA 112,112,112,66,0,0,0,2,0,2,0,2
   ,0,2,0,2,0,2,0,2,0,2,0,2,0,2,0,2,0,2,0
   ,2,0,2,0,2,0,2,0,2,0,2,0,2,0,2
CC 60 DATA 65,0,6
MQ 70 GRAPHICS 0:POKE 1540,PEEK(88):POKE
   1541,PEEK(89)
FV 80 REM Now direct the Atari to our DL
IF 90 POKE 559,0:POKE 560,0:POKE 561,6:SE
   TCOLOR 2,2,8:SETCOLOR 4,0,10:SETCOLOR
   1,2,0:POKE 559,34
RS 100 LIST
```

Listing 3

You are now looking at what is going on in Page 0 and succeeding Pages 1 to 3. If you wish, you can set an LMS instruction on every mode line, so that each line displays a different area of memory.

Following the LMS code and its two operand bytes, there are a series of 6's. These are the Antic instruction codes for Graphics 1 (remember that Antic uses different code numbers to BASIC and the Operating System). If you count them, you will see that there are 19 '6' codes, which together with the one incorporated in the LMS code makes a total of 20 mode lines of Graphics 1.

Following these is another LMS instruction with a Graphics 0 code added. This directs Antic to a different memory area for the text window, which is of course in Graphics 0. The following two bytes are the start of the text window memory area and are followed by three lines of Graphics 0.

The final three bytes are an instruction to Antic to go back to the start of the DL and repeat the program over again. The code 65 means 'jump and wait for vertical blank', this is telling Antic not to start drawing the screen until the electron beam has returned to the top left-hand corner and the vertical blank period is over. The two bytes following the Jump instruction are the starting memory location for the DL itself, and are therefore the same as in locations 560 and 561. Your DL must always end with this instruction.

Simple arithmetic shows that we have 20 lines of Graphics 1 each eight scan lines high, and four lines of Graphics 0, also eight scan lines high. This makes a total of $20 \times 8 + 4 \times 8 = 192$ scan lines. When designing your own DL, you should always approach this magic figure as closely as possible. Having less than 192 scan lines doesn't matter - you merely have a slightly smaller picture - but exceeding 192 does matter, since it may cause the picture to roll unpleasantly. If you must exceed 192, compensate by reducing the number of blank lines at the top - but remember that you may get picture cutoff as a result.

Now rerun Listing 1, and this time examine the DL for Graphics 8. You will see that as well as the LMS at the start of the DL and the one for the text window, there is a third in the middle of the DL. This must be present because of a limitation of Antic's memory counter, which cannot count past a 4K memory boundary. The practical meaning of this is that any Graphics mode displaying more than 4K of screen memory (e.g. Graphics 8-11) will need an additional LMS instruction in its display list in order to reset the memory counter and cross the 4K barrier.

There are three final instructions to consider, which don't appear in the 'built-in' DLs. These are:

128	call Display List Interrupt
16	horizontal fine scroll
32	vertical fine scroll

Any or all of these can be added to to any mode line (together with the LMS code if you wish). They are discussed more fully overleaf.

continued overleaf

DISPLAY LISTS continued

CUSTOM-BUILT DISPLAY LISTS

There is no need for the Atari programmer to be restricted to the 'official' DLs and Graphics modes programmed into the Atari. By modifying the DL you can format the screen in virtually any way you wish. It is easiest to explain how this is done by means of examples.

Before we start I should point out that there are two ways of going about creating your customised DL. The first is to modify an existing DL, set up by a GRAPHICS statement, and the second is to create an entirely new one somewhere in a protected memory area. In general I would recommend the second approach, except for very small changes, since you can then bring your new DL into effect simply by changing the pointer at locations 560 and 561. Changing an existing DL may take a noticeable amount of time, and may be impossible if your new DL is longer than the existing one.

Example 1: Graphics 8 is fine in terms of resolution, but sadly lacking in colour. What is worse, the text window is in the same colour as the main part of the screen. However, we can improve this by changing the text window to Graphics 1, allowing four colour text. Listing 2 does this.

This program is very straightforward, it finds the start of the Graphics 8 DL and then POKEs the appropriate locations with the Antic code for Graphics 1. Line 40 may need some explanation however. The Operating System thinks that the text window is in Graphics 0 - but Antic must now display it as Graphics 1. This is a potential conflict, since the O.S. allocates 40 bytes per line for the text window, whilst Antic only uses 20 bytes per line. This would alter the position of text PRINTed in the window. We resolve this by telling the O.S. that the window is now in Graphics 1 by POKEing location 659 with 1.

Example 2: I indicated earlier that it was possible to insert blank scan lines in the middle of a DL. This is demonstrated by Listing 3. This effect gives rather an attractive 'ruled page' appearance which could be useful in long text displays to break up the text (for example, in text adventures). Notice that the screen editor entirely ignores the blank lines - the cursor jumps from one mode line to the next. Unfortunately, putting in the blanks means that we can only put 21 Graphics 0 lines on the screen - this makes it difficult to use this screen for typing in a BASIC program for example (try it, and see what happens when you reach the bottom of the screen).

However, this program also demonstrates how to set up a new DL from scratch. It must be placed in a suitable memory area - such as page six. Display lists are not relocatable due to the jump instruction at the end. The first three lines of the program READ the DATA for the new DL and POKE it into page six. Remember that zero is the code for one blank line and two is the code for Graphics 0. We must then allocate some memory space for the screen - in this case, done easily by the Graphics 0 call in line 70. We then need to know the starting memory location for the screen memory, which can be found from locations 88 and 89. These values are POKEd into the appropriate locations in page six. Space was reserved for these by the two zeroes following the LMS instruction (fourth number in line 50). If other LMS codes were present in our new DL we would of course have had to reserve space for the two bytes following each one. The final three bytes are the Jump

```
ED 10 REM Demo. of mixed-mode PRINT/PLOT
HL 20 REM New Display List
DY 30 FOR J=0 TO 35:READ X:POKE 1536+J,X:
   NEXT J:OPEN #6,4,0,"S:"
DW 40 DATA 112,112,112,73,0,0,9,9,9,9,9,9
   ,9,6,7,6,6,6,2,2,2,2,2,6,6,6,7,66,0,0,
   2,2,2,65,0,6
NZ 50 SETCOLOR 2,10,8:SETCOLOR 4,10,8:SET
   COLOR 1,0,0:SETCOLOR 0,0,14
XW 60 REM Set aside memory for screen
NA 70 RAMTOP=PEEK(106):POKE 88,0:POKE 89,
   RAMTOP-4:? CHR$(125)
IU 80 POKE 1540,0:POKE 1541,RAMTOP-4:POKE
    1565,RAMTOP-1:POKE 87,4:POKE 660,0:PO
   KE 661,RAMTOP-1
RU 90 POKE 559,0:POKE 560,0:POKE 561,6:PO
   KE 559,34
VB 100 GOSUB 290
UU 110 POKE 88,100:REM Offset from start
   of screen memory
NM 120 POKE 87,2:POSITION 0,0:? #6;"
    INVADERS"
MS 130 POKE 88,120:POKE 87,1:POSITION 0,0
   :? #6:? #6;"         INVADERS"
ZZ 140 POKE 88,180:POKE 87,0:POSITION 2,0
   :? "This is a demonstration of mixed-m
   ode"
BI 150 ? "printing/plotting. The offset i
   s cal-"
XR 160 ? "culated for each mode window &
   the"
DH 170 ? "screen memory directed to the s
   tart-"
SJ 180 ? "ing memory location of each win
   dow."
HN 190 POKE 88,124:POKE 89,RAMTOP-3:POKE
   87,1:POSITION 0,0
VB 200 ? #6:? #6;"         INVADERS"
VD 210 ? #6:? #6;"         INVADERS"
EK 220 CLOSE #6:POKE 752,1
WP 230 POKE 703,4:REM Set up text window
FB 240 ? "Text window can be used for inp
   uts,"
FG 250 ? "commands, etc. in the usual way
   ."
QO 260 ? "Press  OPTION  to end."
XS 270 IF PEEK(53279)<>3 THEN 270
KX 280 GRAPHICS 0:END
IA 290 REM Routine for giant text in Gr.4
    (Page Six issue 8)
QZ 300 M=57344:S=PEEK(88)+256*PEEK(89):R=
   0:COLOR 1
LP 310 FOR J=1 TO 8:READ CODE,COL:FOR I=0
    TO 7
GZ 320 POKE S+(I*10)+(R*10)+COL,PEEK(M+I+
   (CODE*8))
EY 330 NEXT I:NEXT J
WJ 340 DATA 41,1,46,2,54,3,33,4,36,5,37,6
   ,50,7,51,8
ZJ 350 RETURN
```

Listing 4

instruction followed by the starting location of our new DL - the beginning of page six.

To bring our new DL into effect, we first turn off Antic by POKEing 559 with zero (you don't have to do this, but if you don't then the DL may be changed while Antic is actually drawing a screen, making the picture jerk - which at best looks unprofessional). The DL pointer is then directed to our new DL in line 90 by POKEing 560 and 561 with the low and high bytes of the start of the new DL. Finally, Antic is turned back on again with a POKE 559,34. You can get out of the new DL by any GRAPHICS call. To get back again, simply repeat the steps in this last paragraph.

Example 3: The final example (Listing 4) is a little more complex, but nicely demonstrates a problem encountered when printing or drawing on a mixed-mode screen. Let us suppose that we want to design an attractive title page for a new game. We want to start off with giant text at the top of the screen, then decrease in size towards the middle, where we will print a message. The text will then enlarge again, and lastly there will be a text window for displaying messages and inputting replies. We'll call the program by some sort of dramatic name - say, 'INVADERS', in honour of those little green men who started it all.

Type in Listing 4. Lines 10 to 90 should now be straightforward. Memory is assigned for our screen in line 70, and then the new, mixed-mode, DL is set up. The starting memory location for the text window is obtained from locations 660 and 661 (see Table 1). The method for plotting giant text in Graphics 4 comes from John Hulme in Page 6 issue 8.

The real problem is, how do we PRINT or PLOT to the mixed graphics modes when the O.S. thinks we're in Graphics 0? There are two ways around this. The first is to treat each group of identical mode lines (or more generally, groups of lines with identical memory requirements) as a sort of graphics 'window'. For each window, we would then POKE the screen memory locations 88 and 89 with its starting memory location and to be on the safe side do a POSITION 0,0 to return the cursor to the top left-hand corner of the window. We then POKE 87 with the appropriate BASIC (not Antic) mode number and can now use the normal BASIC printing and drawing commands. Alternatively - especially for character graphics - we could calculate the offset from the start of screen memory and POKE the internal character codes (not the ATASCII codes) directly into the screen memory.

So much for the Display List itself. I suggest you experiment with the above examples and create your own DLs. In the next part of this article, I want to concentrate on some further applications of display list manipulation - the 'hidden' graphics modes, page flipping, the Display List Interrupt, and scrolling. ●

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STARS

by Paul Lay

If you want to write a good space game you need a good background and what better than a scrolling starfield such as used in STAR RAIDERS or GALAXIAN?

The programs presented here give you various starfields to which you can add your own game play. Listing 1 is a simple scrolling star field which uses one missile and a Display List Interrupt service routine to provide an excellent set of scrolling stars which are independent of the playfield. The routine is shorter than it looks as lines 160 - 290 are merely a demo to illustrate how printing to the screen does not affect the stars. Listing 2 is a better version that uses a much more complex Display List Interrupt to give a 3-D effect. Lines 10 - 440 provide the basic routine with the remainder of the program giving a demonstration to show the independence of the stars from the playfield. A further demonstration of the use of this routine is given in Listing 3. This includes some machine code routines to allow you to steer through the stars by using a joystick in port 1. To run this one delete lines 450 - 570 from Listing 2 and add the new lines.

Finally for those of you interested in exploring the routines further I have included the assembler source code for the display list interrupt.

```
EI 1 REM ******************************
JI 2 REM * STAR SCROLLER 1 by Paul Lay *
EA 3 REM * ---------------------------- *
IX 4 REM *  PAGE 6 MAGAZINE - ENGLAND  *
EM 5 REM ******************************
DS 10 GRAPHICS 24:GRAPHICS 7
YW 20 FOR I=1536 TO 1568
PH 30 READ J:POKE I,J:NEXT I
SW 40 DL=PEEK(560)+256*PEEK(561)
YZ 50 FOR I=DL+6 TO DL+83
OB 60 POKE I,141:NEXT I
JM 70 PM=256*(PEEK(106)-24)
VC 80 FOR I=PM+802 TO PM+959 STEP 2
GP 90 POKE I,1:NEXT I
YL 100 FOR I=1569 TO 1669
RW 110 POKE I,RND(1)*255:NEXT I
KK 120 POKE 54279,PM/256
VR 130 POKE 512,0:POKE 513,6
OO 140 POKE 559,62:POKE 53277,3
IY 150 POKE 54286,192:POKE 704,28
JH 160 REM SILLY DEMO
VC 165 ? CHR$(125);CHR$(29);"          S
   TAR SCROLLER";
IE 170 COLOR 1+RND(1)*2
JW 180 X=10+INT(RND(1)*129)
BY 190 Y=INT(RND(1)*65):SOUND 0,200,2,10
WT 200 PLOT X,Y:DRAWTO X,Y+5
SJ 210 DRAWTO X-5,Y+10
SW 220 PLOT X+3,Y
QL 230 DRAWTO X+3,Y+10
UK 240 PLOT X+6,Y
LX 250 DRAWTO X+6,Y+5
YI 260 DRAWTO X+11,Y+10:SOUND 0,0,0,0
TK 270 IF RND(0)<0.1 THEN PUT #6,125:GOTO
   165
VJ 280 POKE 704,16*INT(RND(1)*15)+14
OY 290 GOTO 170
JM 1000 DATA 72,138,72,174,11,212,189
DZ 1010 DATA 33,6,141,10,212,141,4
JB 1020 DATA 208,222,33,6,165,204,41
AK 1030 DATA 1,240,3,222,33,6,230
CC 1040 DATA 204,104,170,104,64
```

```
EI 1 REM ******************************
KF 2 REM * STAR SCROLLER 2 by Paul Lay *
EA 3 REM * ---------------------------- *
IX 4 REM *  PAGE 6 MAGAZINE - ENGLAND  *
EM 5 REM ******************************
BJ 10 GRAPHICS 0:POKE 752,1
FN 20 SETCOLOR 1,0,14:SETCOLOR 2,13,0
DR 30 POSITION 11,8
TI 40 ? " STAR SCROLLER 2 "
HT 50 POSITION 14,12
IM 60 ? "By Paul Lay"
SR 70 FOR I=1536 TO 1704
PM 80 READ J:POKE I,J:NEXT I
YF 90 GRAPHICS 24:GRAPHICS 23
JQ 100 PM=PEEK(106)-24
NJ 110 POKE 54279,PM:PM=256*PM
VF 120 FOR I=PM+798 TO PM+990 STEP 2
ZC 130 POKE I,1:NEXT I
OO 140 POKE 559,62:POKE 53277,3
FV 150 DL=PEEK(560)+256*PEEK(561)
LA 160 POKE DL+3,205
IL 170 FOR I=DL+6 TO DL+100
KY 180 POKE I,141:NEXT I
BE 190 POKE 512,17:POKE 513,6
ZV 200 I=USR(1536)
RP 210 DATA 104,169,0,141,204,0,173
RD 220 DATA 11,212,208,251,169,192,141
IW 230 DATA 14,212,96,72,138,72,152
IN 240 DATA 72,174,204,0,238,204,0
KG 250 DATA 189,0,4,168,141,10,212
JC 260 DATA 141,4,208,9,8,141,18
DD 270 DATA 208,192,120,144,6,192,136
NM 280 DATA 144,3,200,200,136,152,224
```

```
JI 290 DATA 0,240,3,157,255,3,224
AM 300 DATA 47,208,16,173,10,210,141
CO 310 DATA 47,4,169,88,141,0,2
JX 320 DATA 169,6,141,1,2,104,168
RA 330 DATA 104,170,104,64,72,138,72
IP 340 DATA 152,72,174,204,0,238,204
AJ 350 DATA 0,189,0,4,168,141,10
KI 360 DATA 212,141,4,208,9,8,141
PX 370 DATA 18,208,192,120,144,6,192
MQ 380 DATA 136,144,3,200,200,136,152
SQ 390 DATA 224,95,240,12,173,205,0
CB 400 DATA 140,205,0,157,0,4,76
AO 410 DATA 163,6,169,0,141,204,0
EA 420 DATA 173,10,210,141,205,0,169
CL 430 DATA 17,141,0,2,169,6,141
GZ 440 DATA 1,2,104,168,104,170,104,64
HP 450 REM DEMONSTRATION #1
RC 460 FOR I=1 TO 2000:NEXT I
ZK 470 SETCOLOR 0,1,10:SETCOLOR 1,1,8
UJ 480 SETCOLOR 2,1,6
EO 490 X=INT(139*RND(0))
CD 500 Y=INT(75*RND(0)+10)
WO 510 FOR I=X TO X+15
OO 520 COLOR 1:PLOT I,Y+10:DRAWTO I,Y
ND 530 COLOR 2:DRAWTO I+5,Y-5:NEXT I
GY 540 COLOR 3:FOR I=Y TO Y+10
MX 550 PLOT X+16,I:DRAWTO X+21,I-5
QH 560 NEXT I:IF RND(0)>0.1 THEN 490
HF 570 ? #6;CHR$(125);:GOTO 490
```

```
IN 450 REM DEMONSTRATION #2
IK 455 REM FOR STAR SCROLLER 2
OV 460 FOR I=1705 TO 1752
AQ 470 READ J:POKE I,J:NEXT I
MQ 480 SETCOLOR 0,0,14:SETCOLOR 1,7,10
NP 490 COLOR 1:PLOT 79,40:DRAWTO 79,44
IV 500 PLOT 79,54:DRAWTO 79,50
LH 510 PLOT 69,47:DRAWTO 74,47
NA 520 PLOT 89,47:DRAWTO 84,47
OA 530 COLOR 2:PLOT 67,38:DRAWTO 91,38
VS 540 DRAWTO 91,56:DRAWTO 67,56
TW 550 DRAWTO 67,38
AD 560 S=PEEK(632)
HJ 570 IF S=7 THEN I=USR(1705)
OT 580 IF S=11 THEN I=USR(1715)
RC 590 IF S=14 THEN I=USR(1725)
TB 600 IF S=13 THEN I=USR(1746)
PP 610 GOTO 560
BY 620 DATA 162,95,222,0,4,202,16
FU 630 DATA 250,104,96,162,95,254,0
CC 640 DATA 4,202,16,250,104,96,162
FS 650 DATA 1,189,0,4,157,255,3
MM 660 DATA 232,224,96,208,245,104,96
JH 670 DATA 162,94,189,0,4,157,1
OI 680 DATA 4,202,208,247,104,96
```

```
1000  *=$0600
1010 SETUP
1020  PLA
1030  LDA #$00
1040  STA LINECOUNT
1050 REPEAT
1060  LDA $D40B
1070  BNE REPEAT
1080  LDA #192
1090  STA $D40E
1100  RTS
1110 DLI1
1120  PHA
1130  TXA
1140  PHA
1150  TYA
1160  PHA
1170  LDX LINECOUNT
1180  INC LINECOUNT
1190  LDA POSITIONS,X
1200  TAY
1210  STA $D40A
1220  STA $D004
1222  ORA #$08
1224  STA $D012
1230  CPY #120
1240  BCC SKIP1
1241  CPY #136
1242  BCC SKIP1+1
1250  INY
1260  INY
1270 SKIP1
1280  DEY
1290  TYA
1300  CPX #$00
1310  BEQ EXIT1
1320  STA POSITIONS-1,X
1330 EXIT1
1340  CPX #$2F
1350  BNE CONT1
1360  LDA $D20A
1370  STA POSITIONS+$2F
1380  LDA #DLI2&$00FF
1390  STA 512
1400  LDA #DLI2/$0100
1410  STA 513
1420 CONT1
1430  PLA
1440  TAY
1450  PLA
1460  TAX
1470  PLA
1480  RTI
1490 DLI2
1500  PHA
1510  TXA
1520  PHA
1530  TYA
1540  PHA
1550  LDX LINECOUNT
1560  INC LINECOUNT
1570  LDA POSITIONS,X
1580  TAY
1590  STA $D40A
1600  STA $D004
1602  ORA #$08
1604  STA $D012
1610  CPY #120
1620  BCC SKIP2
1621  CPY #136
1622  BCC SKIP2+1
1630  INY
1640  INY
1650 SKIP2
1660  DEY
1670  TYA
1680  CPX #$5F
1690  BEQ EXIT2
1700  LDA LAST
1710  STY LAST
1720  STA POSITIONS,X
1730  JMP EXIT3
1740 EXIT2
1750  LDA #$00
1760  STA LINECOUNT
1770  LDA $D20A
1780  STA LAST
1790  LDA #DLI1&$00FF
1800  STA 512
1810  LDA #DLI1/$0100
1820  STA 513
1830 EXIT3
1840  PLA
1850  TAY
1860  PLA
1870  TAX
1880  PLA
1890  RTI
1900 LINECOUNT=$CC
1910 LAST=$CD
1920 POSITIONS=$400
```

Listing 4 - Assembler source code □



'85 PCW85P

PCW 85

reported by

Les Ellingham

'We came down here to spend some money' complained a couple of lads from far away Durham. True there was not much you could actually BUY for your ATARI at the PCW show but there was quite a lot to see and the promises of much more support for our machines in the future. The ATARI stand hit you in the face as you turned right from the front door but many of the other goodies took a bit of finding. One thing became obvious from the start - playing the roving reporter AND trying to run your own stand was as hard as trying to complete MINER 2049er with only a limited time allowed for play!

Initially I suppose interest centred around ATARI's three large stands, one of which was set up for public relations purposes with tables and chairs for 'important' visitors and private rooms for interviews, whilst the other two housed dozens of small units occupied by software houses and others who had some product or other for ATARI machines. The set up certainly created the right impression judging by some of the press reports following the show with comments such as 'Atari managed to put at least 50 ST's on their stand' and 'Atari live up to their promise'. What it was basically was a *brilliant* piece of promotion using the resources of about 30 other companies to promote the ATARI line. Nobody has ever criticised Jack Tramiel for his marketing ability!

Let's start with **ATARI** themselves. For most media men the focus of attention was not the hardware but Jack Tramiel himself who seemed to be constantly surrounded by TV cameras and press men. Most of what he said merely reinforced, for the sceptics, what he had said before and there were certainly no major new announcements. 520ST's were around in force with just the odd colour monitor but the promised CD ROM unit did not turn up and the solitary 260ST and HARD DISK DRIVE were locked away in a huge glass case on centre stage. What you could see was very impressive but the presentation led to suspicion and rumours. Let us hope that the 260ST is close to production and that it will be available soon in the UK for the future of many of the software houses producing entertainment packages could depend heavily on existing ATARI owners having available a new generation machine they can afford.

To many of those existing owners though the ATARI stand may have been a disappointment for the support of the 130XE or XL machines was minimal with almost all the emphasis on the 520ST. Among those companies showing software for the 8-bit machines were **English Software** with their martial arts program CHOP SUEY and **Bignose Software** who now have the rights to produce THE PAY OFF for the Atari and other machines. Future releases include another two adventures OPERA HOUSE and THE MASK plus a multitasking FORTH system for the 800/XL entitled pFORTH. A newcomer to the ATARI was **Blue Ribbon Software** who had two titles, DIAMOND MINE and SCREWBALL translated from the BBC and to be available at the remarkable price of just £2.50 each. Three further titles are planned and all five will be available on one disk for just £9.95. **Mirrorsoft** now have BOULDERDASH from First Star and FIRST STEPS WITH THE MR MEN for young children at £9.95 and £8.95 respectively. **Miracle Technology** had their MULTI-VIEWTERM communications software and DATARI interface hooked up and exploring Telecom Gold. There was more 8-bit software elsewhere in the show but not much more on the ATARI stand.

So on to the star of the show - the 520ST which had a very impressive range of software - admittedly much of it only in the demo stage - ranging from low price entertainment packages right up to the very top end business applications where you pay so much for the program that they give you the machine free! Included were many languages and development

packages which are likely to be among the first releases but overall the breadth of software that is being developed for this machine is quite amazing.

Starting close to ATARI themselves we had companies such as **Digital Research** showing GEMDraw and various GEM packages many of which are supposed to be included with the machine itself but which had not been completed and **BOS Software** with the BOS Operating System and associated packages of interest only to serious business users. Up in this category were **WASP Software** with dedicated packages for the Printing, Accountancy, Insurance and Legal professions. **Metacomco** who developed the BASIC for the ST had a Macro Assembler for just £49.95, PASCAL at £89.95 and an IBM CROSS DEVELOPMENT SYSTEM which would set you back a cool £1,000! You wouldn't buy that of course but think of the promise that it holds for future software availability on the ST. **GST Systems** had an EDITOR/ASSEMBLER and a CP/M EMULATOR allowing CP/M programs such as Wordstar and dBase II to run on the ST.

Languages and general business applications were the dominant type of software and among them we had **Talent Computer Systems** with a file management system called FLEXFILE allowing many different types of single file applications to be handled. **TDI Software** had TDI MODULA-2/ST billed as the best language for modular programming as well as UCSD PASCAL an industry standard operating system. **Kuma Computers** who have made a name among QL users have a whole range of applications planned at a standard price of £49.95. Among these are K-SPREAD, a spreadsheet that uses the Mouse and Windows, K-SEKA, a very fast Editor/Assembler, K-DATA which is a database allowing transfer to and from other K-series applications, K-WORD a word processor and K-COMM a communications and Viewdata terminal program. To top all this off they have a book coming out - The Atari ST Explored.

Softechnics have a couple of programs transported from the Macintosh. TIMELINK allows you to plan any time or date related activity and RHYTHM, 'part spreadsheet, part calculator'. Back on the language/ development side, **Hisoft** promise a full range after Christmas - they say they will not rush things - which will include DevpacST a sophisticated editor / assembler / debugger.



So far you might be forgiven in thinking that the ST is just a business machine, and without the 260ST that is just what it might turn out to be, but a number of companies have committed themselves to providing entertainment software for the ST. Graphics and sound on a new machine take a lot of exploring and you cannot expect the best for some time so most of the announced packages were of the style of text adventures or the like with one notable exception, BRATACCAS from **Psygnosis**. I must admit that I didn't get a chance to see it but others raved over it and some called it the game of the show! One to look out for when it is released, which will presumably not be until colour monitors are readily available! One adventure that you could actually buy at the time of the show was LANDS OF HAVOC from **Microdeal**, a 2000 screen arcade adventure for just £19.95. Another adventure, or rather two adventures comes from **Talent Computer Systems** who bring you WEST and THE LOST KINGDOM OF ZKUL both of which have been successful on the QL. These two come on one 3½" disk for the inclusive price of £24.95.

One of the first American companies to announce the translation of their existing software to the ST are the acknowledged masters of Adventure, **Infocom** who are translating their complete range. ZORK1 and HITCHHIKERS GUIDE TO THE GALAXY were actually available for purchase at the show. Of the graphics based programs the most impressive was CHESS from **Intelligent Chess Software** with a true 3-D board on screen. And there was more which I didn't get a chance to see including an interpreter from **BTM** allowing BBC programs to be run, a promised 'ELITE' type package from **Firebird**, and CASH TRADER from **Quest International**. In all, the software under development and likely to be available towards the end of this year and early next year is truly astonishing in its variety and holds great promise for establishing the ST as THE machine of 1986.

So far we have covered only the ATARI stand, but what of the rest of the show?

As far as ATARI was concerned the rest of the show was dominated by two companies, Activision and Ariolasoft. Four games were on active display at the **Activision** stand, RESCUE ON FRACTALUS and BALLBLAZER and somewhat unexpectedly as they are only just available in the States, KORONIS RIFT and THE EIDOLON which again feature fractal graphics and look to be a couple of stunners. Lack of time prevented a proper look but what I did see was very impressive and hopefully we can bring you a full review shortly. After a lengthy period in which they appeared to desert the ATARI, Activision are bringing out some really top class software over the coming

months. Some programs will be available by the time you read this but those to look out for include HACKER one of the most innovative programs of recent times in which you explore a host computer you have accidentally accessed. There are no instructions, no rules, no help. The screen just say 'Log on please'! For adventurers comes MINDSHADOW a fully illustrated graphic adventure with animation. THE DESIGNER'S PENCIL is a creative program combining both art and music and GAMEMAKER allows you to create your own arcade style games with options for novice and advanced programmers. The 'ultimate' flight simulator is said to be SPACE SHUTTLE designed in consultation with NASA where you control none other than the Shuttle itself. Finally from Activision comes THE GREAT AMERICAN CROSS COUNTRY ROAD RACE a driving simulation in which you race through 25 cities across the States.

Ariolasoft are also supporting ATARI in a big way by bringing to the UK some of the best in entertainment and application software from the U.S.A. Their stand was dominated by a huge projection TV screen showing music videos which was commandeered midway through the show by Jeff Minter for use in demonstrating COLOURSPACE. Not many watched the videos but once Colourspace was up and running crowds lined up along the balcony. Ariolasoft have already released many of the Electronic Arts programs at super prices and promise more to come. PINBALL CONSTRUCTION SET, MUSIC CONSTRUCTION SET and SEVEN CITIES OF GOLD should be widely available by now and all have a superb reputation from past imports. In the 'mid-price' range at £9.95 on disk only they have AXIS ASSASSIN a sort of Centipede and D-BUG in which you investigate the failed Operating System of a computer. Coming soon is ARCHON II: ADEPT which carries the ARCHON game to new heights and a new strategy game called THINK! played on a 6 x 6 grid. Ariolasoft are not just into games though for they have signed an agreement with Batteries Included to bring out their range of Personal Productivity programs. All of these have received superb reviews in the U.S. and we can now look forward to wide availability here. NEW PAPERCLIP is a professional word processor to retail at £59.95 and HOMEPAK combines a word processor, database and telecommunications package in one program for just £39.95. B/GRAPH is the best graph program available for the ATARI and is worth £49.95 for anybody who has any business applications they want to run on an 8-bit machine. Other releases to look out for are GOLF CONSTRUCTION SET and PAINTBOX both on disk or cassette.

Several companies have tried to bring U.S. software over here in the past with varying degrees of success but both Ariolasoft and Activision have the resources to make it succeed. First class presentation and promotion should ensure that the best from the U.S continues to come our way.

U.S.GOLD of course are well known for their licensing of games from America but from their stand you could be forgiven for thinking that they had now gone into the video business. RAMBO and ZORRO blared out from a combined OCEAN and U.S.GOLD stand and an impressive array of software was promised including many strategy titles from SSI as well as NEW YORK CITY, BLUE MAX 2001, SUPER ZAXXON from Synapse, GOONIES and ZORRO from Datasoft and many, many more. Look out for the usual U.S.GOLD colour spreads in the coming months.

And among the rest we had **Anirog** who have TRIVIA - a version of the popular Trivial Pursuit at £7.95 with FIVE-A-SIDE and JUMP JET to come. **Llamasoft** showed a prototype version of COLOURSPACE running on one of the few ST's hooked up to a colour monitor (a Microvitec) and had a great psychedelically painted 130XE! **Novagen Software** had their own stand for MERCENARY, the successor to ENCOUNTER although they were late setting up their stand so I didn't get a chance to see it although visitors to the PAGE 6 stand raved about it. **Audiogenic Software** had XL and XE versions of the MICRO SWIFT SPREADSHEET and **Alligata Software** had SHOOT EM UP (I wonder if this is the old C.S.Software game?). **Beyond Software** at last promise an Atari version of one of First Star's titles, SUPERMAN and **Precision Software** has SUPERSCRIPT. **System 3 Software** were apparently banned for promoting TWISTER with scantily clad 'harlots' but still promise versions of TWISTER, INTERNATIONAL KARATE and THE NITRO GYCLERIC NINJA for the ATARI.

Tynesoft Computer Software, who I missed, apparently had a range of software prepared for the 260ST and there were books on the ST and XL/XE, a printer interface cable from **Connexions** at £39.95 and probably a lot more that I failed to see.

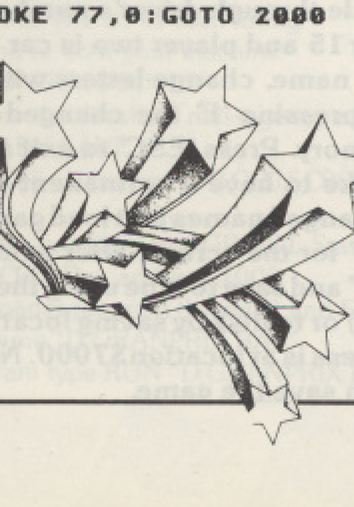
So was it all worth it? Well, the PCW Show of 1985 was certainly the best showing for ATARI in the last 5 years and holds great promise for the future success of ATARI. Whether that success will be heavily slanted towards the ST I don't know but the media, the software houses and the press were certainly excited more by ATARI than by any other manufacturer. The 130XE (and other 8-bit machines) look to have some good support from software companies new to ATARI, let's just hope that they advertise their wares (in PAGE6?) and sell in sufficient quantities to continue that support. If you are happy with you existing machine it is worth sticking with it but keep an eye on the ST for it is the machine of the future. Maybe not for a year or two though so you have time.

Meanwhile those of us who have made the commitment to an ST can look forward to the voyage of discovery all over again only this time the field is wider, the rewards potentially greater and the time spent programming a lot longer. Already I know of over 20 books planned for the ST between now and February and there will be plenty more. There will be hundreds of items of software and much of it will come from the UK.

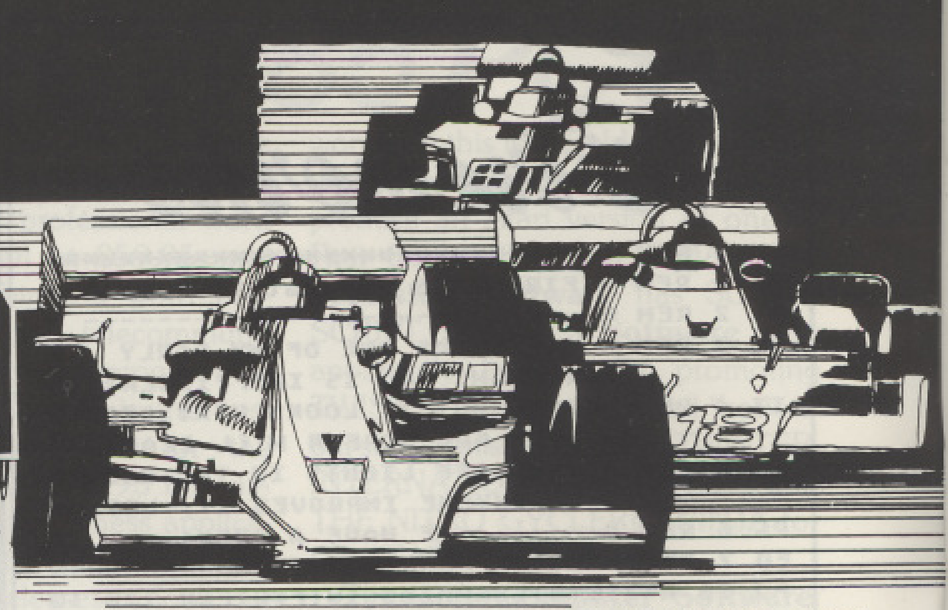
Jim Capparell of ANTIC was impressed by the amount of software being developed. Leonard Tramiel was astonished at the amount of software British companies had developed in such a short time. 'Much more than in the U.S.' Who knows what we may see at the ATARI USER SHOW next May!

Demo Fireworks

```
EH 0 REM ********************************
JE 1 REM * FIREWORKS  by Matthew Jones *
DZ 2 REM * ---------------------------- *
QA 3 REM *  THIS WAS ONE OF MY EARLY   *
         *PROGRAMS AND IS INEFFICIENTLY*
IZ 4 REM *CODED BUT IT LOOKS VERY GOOD.*
         * WHEN RUN SCREEN WILL BLANK. *
GG 5 REM * TURN OFF LIGHTS IN THE ROOM *
         * IF ANYONE IMPROVES IT, LET  *
PG 6 REM *        ME HAVE A COPY!      *
EO 7 REM ********************************
PJ 20 N=2:C=0:GRAPHICS 10:F=0:FOR I=0 TO
   8:POKE 704+I,0:NEXT I
YV 30 COLOR 1
EL 40 POKE 704,0
MT 50 FIRE=2000
GH 200 DATA 1.9,1.2,1.8,-1.3,2.1,1.4,2.0,
   -1.4,1,.5,1.1,-.7,1.2,.9,.9,-1,1.7,.8,
   2,-.9
AB 210 DATA 2.2,0.3, 2.3,-.3
GV 240 F=F+1:IF F=13 THEN GOTO FIRE
DX 250 RESTORE 200:FOR I=1 TO F:READ H,W:
   NEXT I:RESTORE 1000:TRAP 800
OX 300 READ X,Y:X=INT(X*W):Y=INT(Y*2*H)
AH 310 PLOT 40+X,190-Y:C=C+1:IF C>10 THEN
    C=0:N=N+1:IF N>9 THEN N=1
JY 330 COLOR N
QW 340 J=J+1
MM 350 GOTO 300
BJ 800 TRAP 40000:IF PEEK(195)<>6 THEN ?
    "ERROR ";PEEK(195);"LINE";PEEK(187)*25
   6+PEEK(186):END
NZ 805 N=1:C=0
NR 810 GOTO 240
XD 1000 DATA 1,1,1,2,1,3,1,4,1,5,1,6,1,7,
   1,8,1,9,1,10,1,11,2,11,1,12,2,12,2,13
SN 1010 DATA 2,14,2,15,2,16,2,17,2,18,2,1
   9,3,20,3,19,2,20,3,21,3,20,3,21,4,22
QQ 1020 DATA 4,23,4,24,4,25,5,22,5,23,5,2
   4,5,25,5,26,6,27,6,26,5,27,6,28,6,29,6
   ,30,7,28,7,29,7,30,7,31,7,32,8,31
LA 1030 DATA 8,32,8,33,8,34,9,33,9,34,9,3
   5,10,35,10,36,11,36,11,37,12,37,12,38,
   13,38,13,39,14
FP 1035 DATA 39,15,39,3,22,3,23,18,3
AW 1040 DATA 19,39,20,39,15,40,16,40,17,4
   0,18,40,19,38,20,38,20,37,21,38,21,37,
   22,36,21,36,22,35,23,35,23,34,23,33
FF 1050 DATA 24,33,24,32,24,31,25,30,25,2
   9,25,28,26,26,25,27,23
GP 2000 FOR Z=1 TO 8
DZ 2005 FOR I=6 TO 0 STEP -1:POKE 706+I,P
   EEK(705+I):NEXT I
WX 2010 FOR I=1 TO 15:NEXT I
DT 2020 A=A-2+16*(A=0)
KM 2030 POKE 705,(B*16+A)
MY 2035 NEXT Z
UW 2037 B=B+1-16*(B=15)
HT 2040 POKE 77,0:GOTO 2000
```



GRAND PRIX II



REQUIRES 48K

by Chris Darkes

Grand Prix II is a one or two player game requiring joysticks to race your car(s) against the fourteen cars controlled by the computer. You have a plan view of the track with safe cornering speeds shown on the inside of each bend. You will have to exceed these speeds to win but if you take a bend at a speed in excess of 30 m.p.h. above the safe speed your speed will reduce to the safe bend speed simulating a skid, and your tyres' life will be reduced. Fuel and tyres are reduced as the game progresses. If the tyres reach 10 you have to keep to safe cornering speeds. Reduce your tyre strength to 0 and you will be wiped off screen and take no further part in the race. The same applies if your fuel reaches 0.

Player one's speed, tyres, fuel, and current lap will be shown on the bottom left of screen, with the same information for player two on the bottom right. Above players two's position and lap readout, 'POS=' will show the position of each car as it passes the finishing line during the race so you can see exactly which cars are the leaders. If a down facing arrow is shown the last car to pass the line was a back marker (lower than 9th place). You can access pits on any lap (but not along starting straight) and race from 5 laps and up to 80.

The cars are capable of around 230 m.p.h with slip streaming but this depends on each cars engine performance. At the start of each race each car receives it's top speed capability and it's accelerating capability, which will not change during that race, then it will receive it's position on the grid. The minimum top speed allowed for each car is 160 m.p.h. You accelerate by pressing fire button, decelerate by releasing button and brake by pulling joystick back.

Player one's car is yellow, player two's black. Pressing the 'X' key at any time during race will pause the action and erase the yellow (player one) car. Press any number key to continue the race and then computer car No.14's condition is shown in place of player one's. Note that player two (black car) will be erased automatically by the computer if the fire button on joystick 2 is not pressed at start of race, after this it cannot be taken out of race unless forced by lack of tyres or fuel. You can, if you wish, take no part in the race and just sit back and watch the computer cars compete. When you erase either player or both the computer will use that player's colour for some of its cars.

At the end of the race the FINISHING RESULTS screen will appear and will list the driver's finishing positions.

COMPUTER CARS

Yellow computer cars are driven by the most experienced and have the better chance of the faster cars. The driver's experience and car performance then reduce through blue then red to the most inexperienced, and least likely to receive a hot car, represent by black.

SPECIAL KEYS

X	Exit yellow car **
S	Pits for player one
P	Pits for player two
SPACE	Pause **
ESC	Terminate race

**** Note. Press number keys to resume after these key strokes.**

SPECIAL SCREENS

From original screen (FINISHING RESULTS) you can access a DATA CHANGE SCREEN by pressing 'D', or you can access the NAME CHANGE SCREEN by pressing 'N'.

DATA CHANGE SCREEN

With player one's joystick select race length (default is 20 laps) then press fire to input new selection, and continue through this screen changing whatever default settings you wish, they will stay at your new set values till you access this screen again when they will revert to default. On this screen you can change laps, visual speed (cars will appear to go faster to it's actual speed, effectively making the track seem longer or shorter to the cars), computer car's handicap (higher the setting the less competitive they will be), and player one and player two handicaps (works the same way as computer handicap to allow different skilled player's to compete on a equal chance of success).

NAME CHANGE SCREEN

Press 'E' to cycle through driver's numbers and names Player one is car 15 and player two is car 16. When you have the desired name, change letters with player one's joystick and by pressing 'E' the changed name will be entered into memory. Press 'ESC' to exit screen.

If you would like to have a permanent copy of Grand Prix II with the changed names just load game in the usual way and press 'N' for the screen, alter names then press 'SYSTEM RESET' and save to tape using the cassette save routine (Listing 7) or to disk by saving locations $5C00 to $9C00. Run address is at location $7000. Note. You must not race and then save the game.

```
EI 1 REM ******************************
WC 2 REM *      GRAND PRIX II         *
FM 3 REM *     by Chris Darkes        *
TB 4 REM *                            *
EN 5 REM *   Four parts - Listing 1   *
ED 6 REM * -------------------------- *
JA 7 REM *  PAGE 6 MAGAZINE - ENGLAND *
EP 8 REM ******************************
NO 9 REM
BP 10 REM SAVE"D:GRANPRIX.1
BA 11 REM
UY 50 ? CHR$(125):? "Cassette(0) or Disk(
   1) ";:INPUT TYPE:POKE 1792,TYPE:? CHR$
   (125)
BK 100 TRAP 190:SCREEN=559:POKE SCREEN,0:
   MEM=23551:LIN=0:RESTORE 1000
HX 110 FOR I=1 TO 25:READ A
VF 115 DATLINE=PEEK(183)+256*PEEK(184):LI
   N=DATLINE-1000
LL 120 POKE MEM+(LIN*25)+I,A:NEXT I
LX 130 GOTO 110
BM 190 POKE 559,34:IF PEEK(195)<>6 THEN ?
    "K■ERROR - CHECK TYPING":END
FB 200 IF PEEK(1792) THEN RUN "D:GRANPRIX
   .2"
HK 210 CLOAD
PR 999 END
WV 1000 DATA 0,0,0,0,0,0,0,0,0,24,24,24,2
   4,0,24,0,0,102,102,102,0,0,0,0,0
FZ 1001 DATA 102,255,102,102,255,102,0,24
   ,62,96,60,6,124,24,0,0,102,108,24,48,1
   02,70,0,28,54
MQ 1002 DATA 28,56,111,102,59,0,0,24,24,2
   4,0,0,0,0,0,14,28,24,24,28,14,0,0,112,
   56
XO 1003 DATA 24,24,56,112,0,0,102,60,255,
   60,102,0,0,0,24,24,126,24,24,0,0,0,0,0
   ,0
BH 1004 DATA 0,24,24,48,0,0,0,126,0,0,0,0
   ,0,0,0,0,0,24,24,0,0,6,12,24,48
KK 1005 DATA 96,64,0,0,60,102,110,118,102
   ,60,0,0,24,56,24,24,24,126,0,0,60,102,
   12,24,48
ZW 1006 DATA 126,0,0,126,12,24,12,102,60,
   0,0,12,28,60,108,126,12,0,0,126,96,124
   ,6,102,60
HP 1007 DATA 0,0,60,96,124,102,102,60,0,0
   ,126,6,12,24,48,48,0,0,60,102,60,102,1
   02,60,0
OS 1008 DATA 0,60,102,62,6,12,56,0,0,0,24
   ,24,0,24,24,0,0,0,24,24,0,24,24,48,6
CK 1009 DATA 12,24,48,24,12,6,0,0,0,126,0
   ,0,126,0,0,96,48,24,12,24,48,96,0,0,60
MU 1010 DATA 102,12,24,0,24,0,0,60,102,11
   0,110,96,62,0,0,24,60,102,102,126,102,
   0,0,124,102
LF 1011 DATA 124,102,102,124,0,0,60,102,9
   6,96,102,60,0,0,120,108,102,102,108,12
   0,0,0,126,96,124
WV 1012 DATA 96,96,126,0,0,126,96,124,96,
   96,96,0,0,62,96,96,110,102,62,0,0,102,
   102,126,102
HP 1013 DATA 102,102,0,0,126,24,24,24,24,
   126,0,0,6,6,6,6,102,60,0,0,102,108,120
   ,120,108
FB 1014 DATA 102,0,0,96,96,96,96,96,126,0
   ,0,99,119,127,107,99,99,0,0,102,118,12
   6,126,110,102
VL 1015 DATA 0,0,60,102,102,102,102,60,0,
   0,124,102,102,124,96,96,0,0,60,102,102
   ,102,108,54,0
ST 1016 DATA 0,124,102,102,124,108,102,0,
   0,60,96,60,6,6,60,0,0,126,24,24,24,24,
   24,0,0
CB 1017 DATA 102,102,102,102,102,126,0,0,
   102,102,102,102,60,24,0,0,99,99,107,12
   7,119,99,0,0,102
FP 1018 DATA 102,60,60,102,102,0,0,102,10
   2,60,24,24,24,0,0,126,12,24,48,96,126,
   0,0,30,24
SC 1019 DATA 24,24,24,30,0,0,64,96,48,24,
   12,6,0,0,120,24,24,24,24,120,0,0,8,28,
   54
MB 1020 DATA 99,0,0,0,0,0,0,0,0,0,255,0,0
   ,54,127,127,62,28,8,0,24,24,24,31,31
SB 1021 DATA 24,24,24,3,3,3,3,3,3,3,3,24,
   24,24,248,248,0,0,0,24,24,24,248,248,2
   4
XF 1022 DATA 24,24,0,0,0,248,248,24,24,24
   ,3,7,14,28,56,112,224,192,192,224,112,
   56,28,14,7
PA 1023 DATA 3,1,3,7,15,31,63,127,255,0,0
   ,0,0,15,15,15,15,128,192,224,240,248,2
   52,254,255
RL 1024 DATA 15,15,15,15,0,0,0,0,240,240,
   240,240,0,0,0,0,255,255,0,0,0,0,0,0,0
JL 1025 DATA 0,0,0,0,0,255,255,0,0,0,0,24
   0,240,240,240,0,28,28,119,119,8,28,0,0
   ,0
XF 1026 DATA 0,31,31,24,24,24,0,0,0,255,2
   55,0,0,0,24,24,24,255,255,24,24,24,0,0
   ,60
HN 1027 DATA 126,126,126,60,0,0,0,0,0,255
   ,255,255,255,192,192,192,192,192,192,1
   92,192,0,0,0,255
QA 1028 DATA 255,24,24,24,24,24,24,255,25
   5,0,0,0,240,240,240,240,240,240,240,24
   0,24,24,24,31,31
VC 1029 DATA 0,0,0,120,96,120,96,126,24,3
   0,0,0,24,60,126,24,24,24,0,0,24,24,24,
   126,60
NP 1030 DATA 24,0,0,24,48,126,48,24,0,0,0
   ,24,12,126,12,24,0,0,0,24,60,126,126,6
   0,24
```

CASSETTE USERS

1. Type in each listing, check it with TYPO and CSAVE to cassette with each listing following the last.
2. Switch off and re-boot your machine.
3. Rewind tape, CLOAD and RUN the first program.
4. As buzzer sounds, CLOAD and RUN remaining programs until the 'finished' prompt appears.
5. Without switching off the machine, type in the cassette loader program (Listing 6) and CSAVE it *to a new tape*. Leave tape in position.
6. Type in the cassette save program (Listing 7) and RUN it. When signalled with 2 buzzes press RECORD and PLAY and hit RETURN.
7. Rewind tape CLOAD first program and RUN it. Leave PLAY button pressed and hit RETURN when you hear the buzz.

If you have problems running the game from cassette try POKE 742,91 after power up and before the first load or try typing G.40 after the game has loaded.

DISK USERS

1. Type each listing, check it with TYPO and save to disk using the filename shown on line 10 of each listing.
2. Switch off and re-boot your machine.
3. Type RUN "D:GRANPRIX.1"
4. When you see the 'finished' message type DOS and choose option K - BINARY SAVE.
5. DOS 2.0 or 2.5 users type GP.OBJ,5C00,9C00,7000 and press RETURN.
6. DOS 3.0 users use filename: GP.OBJ, Start address: 5C00, End address: 7C00, Run address: 7000.
7. Type in the loader program (listing 5) and SAVE to the same disk using filename "D:GRANPRIX.BAS".
8. To run program type RUN "D:GRANPRIX.BAS".

```
XS 1031 DATA 0,0,0,60,6,62,102,62,0,0,96,
   96,124,102,102,124,0,0,0,60,96,96,96,6
   0,0
KA 1032 DATA 0,6,6,62,102,102,62,0,0,0,60
   ,102,126,96,60,0,0,14,24,62,24,24,24,0
   ,0
QU 1033 DATA 0,62,102,102,62,6,124,0,96,9
   6,124,102,102,102,0,0,24,0,56,24,24,60
   ,0,0,6
PR 1034 DATA 0,6,6,6,6,60,0,96,96,108,120
   ,108,102,0,0,56,24,24,24,24,60,0,0,0,1
   02
IO 1035 DATA 127,127,107,99,0,0,0,124,102
   ,102,102,102,0,0,0,60,102,102,102,60,0
   ,0,0,124,102
CQ 1036 DATA 102,124,96,96,0,0,62,102,102
   ,62,6,6,0,0,124,102,96,96,96,0,0,0,62,
   96,60
ZZ 1037 DATA 6,124,0,0,24,126,24,24,24,14
   ,0,0,0,102,102,102,102,62,0,0,0,102,10
   2,102,60
EP 1038 DATA 24,0,0,0,99,107,127,62,54,0,
   0,0,102,60,24,60,102,0,0,0,102,102,102
   ,62,12
JB 1039 DATA 120,0,0,126,12,24,48,126,0,0
   ,24,60,126,126,24,60,0,24,24,24,24,24,
   24,24,24
JR 1040 DATA 0,126,120,124,110,102,6,0,8,
   24,56,120,56,24,8,0,16,24,28,30,28,24,
   16,0,112
VC 1041 DATA 112,70,64,96,2,2,2,2,2,2,2,2
   ,2,2,2,2,2,2,2,2,2,2,2,6
WT 1042 DATA 6,6,6,65,0,96,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,0
DC 1043 DATA 0,0,0,0,0,0,0,0,0,0,0,0,38
   ,41,46,41,51,40,41,46,39,0,48,47
KW 1044 DATA 51,41,52,41,47,46,51,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0,0
TS 1047 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,17,115,116,0,0,0,0,0,0
IL 1049 DATA 0,0,0,0,0,18,110,100,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0
RE 1050 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,19,114,100,0,0
VT 1052 DATA 0,0,0,0,0,0,0,0,0,20,116,1
   04,0,0,0,0,0,0,0,0,0,0,0
DH 1054 DATA 21,116,104,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0
JB 1055 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,22,116,104,0,0,0,0,0,0
PL 1057 DATA 0,0,0,0,0,23,116,104,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0
XX 1058 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,24,116,104,0,0
BS 1060 DATA 0,0,0,0,0,0,0,0,0,25,116,1
   04,0,0,0,0,0,0,0,0,0,0,0
JM 1061 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,0,17
EZ 1062 DATA 16,116,104,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0
QX 1063 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   17,17,116,104,0,0,0,0,0,0
MO 1065 DATA 0,0,0,0,17,18,116,104,0,0,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0
LF 1066 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,17,19,116,104,0,0
UG 1068 DATA 0,0,0,0,0,0,0,0,0,17,20,116,
   104,0,0,0,0,0,0,0,0,0,0,0
KS 1069 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,0,17
CX 1070 DATA 21,116,104,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0
KB 1071 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   17,22,116,104,0,0,0,0,0,0
DG 1076 DATA 0,0,0,0,0,0,0,112,114,101,
   115,115,0,115,116,97,114,116,0,116,111
   ,0,114,97
JN 1077 DATA 99,101,0,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0
YK 1078 DATA 0,0,0,183,178,169,180,180,16
   5,174,0,162,185,0,0,0,0,0,0,0,0,227,
   232,242
NY 1079 DATA 233,243,0,228,225,242,235,22
   9,243,0,0,0,0,0,0,0,0,0,0,0,0,0,0
WZ 1133 DATA 0,0,0,112,112,112,68,40,135,
   4,4,4,4,4,4,4,4,4,4,4,4,4,4,4
KF 1134 DATA 4,4,4,4,4,4,4,15,2,2,65,0,13
   5,0,0,0,0,0,0,132,87,99,87,87
TA 1135 DATA 235,87,87,235,87,87,235,87,8
   7,107,87,87,107,87,87,107,87,87,107,89
   ,87,87,87,87,87
LJ 1136 DATA 87,87,87,87,87,86,91,0,0,132
   ,85,66,87,87,235,87,87,235,87,87,235,8
   7,87,107,87
HV 1137 DATA 87,107,87,87,107,87,87,107,8
   7,89,87,87,87,87,87,87,87,87,86,86,85,
   86,91,0,87
AL 1138 DATA 87,140,0,0,0,0,0,0,0,0,0,0
   ,0,0,5,84,1,0,0,0,0,0,0,0
QW 1139 DATA 0,0,0,0,0,0,0,113,115,122,3,
   87,86,0,87,86,113,114,122,0,0,0,0,0,4
PX 1140 DATA 84,84,84,84,84,84,1,0,0,0,0,
   4,86,87,87,87,87,87,87,87,87,86,91,0,0
YG 1141 DATA 0,87,87,0,87,87,0,0,0,0,0,0,
   0,4,83,84,1,0,0,0,0,0,0,0
ED 1142 DATA 4,86,85,87,87,87,87,87,87,87
   ,87,87,86,91,0,0,87,87,0,87,87,0,0,0,0
PQ 1143 DATA 0,0,4,83,84,1,0,0,0,0,0,0,0,
   0,4,87,87,1,0,0,0,0,0,0
PA 1144 DATA 0,3,85,86,91,0,87,87,0,87,87
   ,0,0,0,0,0,4,83,84,1,0,0,0,0,0
QE 1145 DATA 0,0,0,4,87,87,1,113,118,122,
   0,0,0,0,113,117,122,3,87,86,0,87,87,0,
   87
ZZ 1146 DATA 87,0,0,0,0,4,83,84,1,0,0,0,0
   ,0,0,0,0,4,87,87,1,0,0,0,0
JF 1147 DATA 0,0,0,0,0,0,0,87,87,0,87,8
   7,0,87,87,0,0,0,4,83,84,1,0,0
GR 1148 DATA 0,0,0,0,0,0,4,87,87,1,0,0,0,
   0,4,86,86,86,86,91,0,0,0,87,87
BO 1149 DATA 0,87,87,0,87,87,0,0,4,83,84,
   1,0,0,0,0,0,0,0,0,4,87,87,1,0
ZJ 1150 DATA 0,0,0,4,87,87,85,87,86,86,0,
   0,0,87,87,0,87,87,0,87,87,0,4,83,84
NP 1151 DATA 1,0,0,0,0,0,0,0,0,4,87,87,1,
   0,0,0,0,4,87,86,1,0,9,87,86
UC 1152 DATA 0,0,0,87,87,0,87,87,0,87,87,
   4,83,84,1,0,0,0,0,0,0,0,0,4,87
MQ 1153 DATA 87,1,0,0,0,0,4,87,87,1,118,1
   22,4,87,86,0,0,0,87,87,0,87,87,0,87
HS 1154 DATA 87,86,84,1,0,0,0,0,0,0,0,0,4
   ,87,87,1,0,0,0,0,4,87,87,1,0
AR 1155 DATA 0,4,87,87,1,0,0,0,87,87,0,87
   ,87,0,86,87,84,1,0,0,0,0,113,118,122
BB 1156 DATA 0,4,87,87,1,0,0,0,0,4,87,87,
   1,0,0,4,87,87,1,0,0,0,0,87,87
LR 1157 DATA 0,87,87,0,86,85,7,118,122,0,
   0,0,0,0,0,4,87,87,1,0,0,0,0,4,87
NK 1158 DATA 87,1,0,0,4,87,87,1,0,0,0,0,0
   ,87,87,0,87,87,0,86,87,86,86,87,87
TT 1159 DATA 87,87,87,87,87,85,87,1,0,0,0
   ,0,4,87,87,1,0,0,4,87,87,1,0,0,0
HY 1160 DATA 0,0,0,87,87,0,87,87,0,131,86
   ,87,87,87,87,87,87,87,87,87,86,1,0,0,0
RC 1161 DATA 0,4,87,87,1,0,0,4,87,86,1,11
   6,122,0,0,0,120,122,87,87,0,87,87,0,0
MH 1162 DATA 0,0,0,0,0,0,0,0,0,0,0,0,113,
   122,122,4,87,87,1,0,0,4,86,87,1
ZW 1163 DATA 0,0,0,0,0,0,0,10,87,86,0,87,
   87,0,0,0,0,0,0,0,0,0,0,0,0
WP 1164 DATA 0,0,0,0,4,87,87,1,0,0,0,86,8
   6,85,86,87,87,87,87,87,87,87,85,86,86
HV 1165 DATA 0,87,87,0,0,4,86,87,87,87,87
   ,87,87,87,87,87,87,87,87,85,86,1,0,0,0
JY 1166 DATA 0,3,86,86,87,87,87,87,87,87,
   87,87,86,86,1,0,87,87,0,4,86,87,87,87,
   87
QE 1167 DATA 87,87,87,87,87,87,87,87,87,8
```

```
   6,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0
TQ 1168 DATA 0,0,113,116,122,4,87,86,0,86
   ,85,7,113,113,122,0,0,0,0,0,0,0,0,0
YX 1169 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,10,85,86,1,0,3
TE 1170 DATA 87,87,86,87,87,87,87,87,87,8
   7,87,87,87,87,87,87,87,87,87,87,87,87,
   87,87,87
QC 1171 DATA 87,87,87,87,87,87,87,87,87,8
   7,86,1,0,0,0,3,87,87,87,87,87,87,87,87
   ,87
QY 1172 DATA 87,87,87,87,87,87,87,87,87,8
   7,87,87,87,87,87,87,87,87,87,87,87,87,
   87,87,86
VQ 1173 DATA 1,0,0,0,0,0,16,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0
```

```
EI 1 REM ******************************
VH 2 REM *  GRAND PRIX II - LISTING 2  *
EK 3 REM ******************************
NO 9 REM
CN 10 REM SAVE"D:GRANPRIX.2
BA 11 REM
GG 100 TRAP 190:SCREEN=559:POKE SCREEN,0:
   MEM=27901:LIN=0:RESTORE 1000
HX 110 FOR I=1 TO 25:READ A
VF 115 DATLINE=PEEK(183)+256*PEEK(184):LI
   N=DATLINE-1000
LL 120 POKE MEM+(LIN*25)+I,A:NEXT I
LX 130 GOTO 110
BM 190 POKE 559,34:IF PEEK(195)<>6 THEN ?
    "↰▣ERROR - CHECK TYPING":END
GP 200 IF PEEK(1792) THEN RUN "D:GRANPRIX
   .3"
HK 210 CLOAD
PR 999 END
GZ 1000 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,51,29,16,16,16,0,0
UP 1001 DATA 0,0,0,0,0,0,0,0,0,0,0,84,5
   1,29,16,16,16,0,0,0,0,0,0
TQ 1002 DATA 0,0,48,47,51,29,0,0,52,29,0,
   0,0,38,29,0,0,0,48,29,0,0,0,44,29
OP 1003 DATA 0,0,87,52,29,0,0,0,38,29,0,0
   ,0,48,29,0,0,0,44,29,0,0,0,0,0
HP 1010 DATA 0,0,0,0,0,0,0,0,116,116,116,
   116,116,116,116,116,116,116,116,116,11
   6,116,96,96,0
CQ 1014 DATA 0,0,0,0,128,128,128,128,128,
   128,128,128,128,128,128,128,128,128,12
   8,128,0,4,8,10,13
OT 1015 DATA 16,17,18,19,20,28,30,32,34,3
   2,32,0,0,0,0,0,0,0,0,0,0,0,0,0
OJ 1016 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,255,254,252,251,249,248,246
ND 1017 DATA 245,243,242,240,239,237,236,
   234,233,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0
TW 1019 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,2,2
JN 1020 DATA 2,2,2,2,2,2,2,2,2,2,2,2,2,2,
   0,0,0,0,0,0,0,0,0,0,0
QW 1021 DATA 0,0,0,0,0,65,104,62,101,59,9
   8,56,95,53,92,50,89,47,86,44,83,135,13
   5,135,135
BT 1022 DATA 135,135,135,135,135,135,135,
   135,135,135,135,135,87,87,87,87,87,87,
   87,87,87,87,87,87,87
YK 1023 DATA 87,87,87,0,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0
OZ 1025 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,0,2
DZ 1026 DATA 5,0,21,0,0,0,0,0,130,140,110
   ,100,60,40,80,150,160,160,60,120,240,1
   20,240,0,0
FE 1027 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,11,20,35,15,12,10,9,13,10,12
GF 1028 DATA 10,13,23,0,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0
ZQ 1030 DATA 0,0,0,0,7,7,7,7,7,7,7,7,7,7,
   7,7,7,7,7,7,169,0,141,48,2
CP 1031 DATA 141,1,210,141,5,210,169,96,1
   41,49,2,169,92,141,244,2,169,96,141,74
   ,151,169,170,141,73
BE 1032 DATA 151,160,0,162,0,169,0,32,72,
   151,200,238,73,151,169,0,205,73,151,20
   8,3,238,74,151,192
IH 1033 DATA 16,208,233,232,224,16,240,19
   ,160,0,173,73,151,24,105,24,141,73,151
   ,144,215,238,74,151,76
JD 1034 DATA 35,112,169,96,141,74,151,169
   ,170,141,73,151,169,1,141,129,141,160,
   0,204,130,141,240,63,185
CF 1035 DATA 224,141,10,10,10,10,170,189,
   0,132,232,32,72,151,238,73,151,169,0,2
   05,73,151,208,3,238
CC 1036 DATA 74,151,238,129,141,169,16,20
   5,129,141,208,226,169,1,141,129,141,24
   ,173,73,151,105,25,141,73
SK 1037 DATA 151,144,3,238,74,151,200,204
   ,130,141,208,193,174,31,208,202,169,35
   ,205,252,2,208,3,76,0
KN 1038 DATA 114,169,58,205,252,2,208,3,7
   6,0,118,236,31,208,208,231,169,0,141,6
   5,151,169,105,141,66
KF 1039 DATA 151,169,0,141,73,151,169,135
   ,141,74,151,32,64,151,32,72,151,238,65
   ,151,169,0,205,65,151
QK 1040 DATA 208,3,238,66,151,238,73,151,
   169,0,205,73,151,208,3,238,74,151,169,
   142,205,74,151,208,217
EG 1041 DATA 169,32,205,73,151,208,210,17
   3,32,111,141,74,151,72,160,0,173,10,21
   0,153,32,111,200,192,16
FO 1042 DATA 208,245,169,0,160,0,162,0,21
   7,32,111,240,17,200,192,16,208,246,160
   ,0,24,105,1,201,0
IZ 1043 DATA 208,237,76,107,113,72,189,16
   ,111,153,16,141,141,73,151,192,14,240,
   18,192,15,240,19,192,6
SN 1044 DATA 48,5,169,105,76,93,113,169,2
   33,76,93,113,169,97,76,93,113,169,64,2
   4,109,240,140,32,72
SL 1045 DATA 151,232,104,76,37,113,160,0,
   160,0,104,153,32,111,200,192,16,208,24
   8,169,152,141,244,2,169
IB 1046 DATA 0,141,48,2,169,0,141,8,210,1
   33,8,169,3,141,15,210,169,135,141,49,2
   ,160,0,173,10
TU 1047 DATA 210,74,74,24,121,96,140,153,
   96,140,200,192,16,208,239,160,0,173,10
   ,210,74,74,74,24,121
BV 1048 DATA 112,140,153,112,140,200,192,
   16,208,238,208,217,162,0,169,37,141,1,
   210,169,36,141,5,210,169
HU 1049 DATA 255,141,0,210,141,4,210,169,
   140,133,20,164,19,200,196,19,208,252,1
   69,255,141,252,2,32,32
HF 1050 DATA 142,76,0,112,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0,0
BE 1051 DATA 0,0,0,0,0,0,0,169,0,141,48,2
   ,141,129,141,169,129,141,49,2,169,224,
   141,65,151
EL 1052 DATA 169,132,141,66,151,162,0,160
   ,0,169,16,141,61,129,169,16,141,60,129
   ,185,0,132,157,65,129
WB 1053 DATA 157,105,129,200,232,224,16,2
   08,241,173,105,129,141,129,141,238,61,
   129,169,26,205,61,129,208,8
YO 1054 DATA 169,16,141,61,129,238,60,129
   ,162,0,169,28,205,252,2,208,3,76,0,112
   ,173,120,2,201,11
AA 1055 DATA 240,18,201,7,240,24,201,14,2
   40,36,201,13,240,59,173,129,141,76,190
   ,114,202,224,255,208,12
XJ 1056 DATA 162,15,76,130,114,232,224,16
   ,208,2,162,0,189,105,129,141,129,141,7
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   6,190,114,238,129,141,173
QW 1057 DATA 129,141,201,1,208,5,169,33,1
   41,129,141,201,59,208,32,169,0,141,129
   ,141,76,190,114,206,129
XB 1058 DATA 141,173,129,141,201,255,208,
   5,169,58,141,129,141,201,32,208,5,169,
   0,141,129,141,24,105,128
TN 1059 DATA 157,105,129,141,129,141,165,
   20,24,105,2,197,20,208,252,173,129,141
   ,24,105,128,157,105,129,141
ME 1060 DATA 129,141,165,20,24,105,7,197,
   20,208,252,169,0,205,132,2,208,14,232,
   224,16,240,19,189,105
DY 1061 DATA 129,141,129,141,76,78,114,16
   9,42,205,252,2,240,3,76,78,114,169,255
   ,141,252,2,224,2,144
LH 1062 DATA 19,162,15,189,105,129,136,15
   3,0,132,202,224,255,208,244,152,24,105
   ,16,168,192,0,240,5,162
DH 1063 DATA 0,76,37,114,76,23,114,0,0,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
JS 1073 DATA 0,112,112,112,71,64,116,112,
   112,112,112,2,112,2,112,2,112,2,112,2,
   65,32,116,0,0
CK 1074 DATA 0,0,0,0,0,0,0,0,36,33,52,3
   3,0,35,40,33,46,39,37,0,51,35,50,37
TT 1075 DATA 37,46,0,0,44,37,46,39,40,0,4
   7,38,0,50,33,35,37,29,0,0,0,44,33,48,5
   1
NB 1076 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,54,41,51,53,33,44
FV 1077 DATA 0,51,48,37,37,36,0,29,0,0,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0,0
BU 1078 DATA 0,0,0,0,0,0,0,0,0,0,35,47,45,4
   8,53,52,37,50,0,35,33,50,51,29,0,0
WJ 1079 DATA 0,40,33,46,36,41,35,33,48,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0,0,48
EA 1080 DATA 44,33,57,37,50,0,47,46,37,0,
   0,0,29,0,0,0,40,33,46,36,41,35,33,48,0
GK 1081 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   48,44,33,57,37,50,0,52,55,47,0
ZA 1082 DATA 0,0,29,0,0,0,40,33,46,36,41,
   35,33,48,0,0,0,0,0,0,0,0,0,0,0
EM 1085 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,105,7,197,20
PJ 1086 DATA 208,252,173,132,2,201,0,208,
   177,142,138,111,76,0,112,0,0,0,0,0,0,0
   ,0,0,0
CB 1092 DATA 0,0,0,0,0,169,255,141,252,
   2,169,32,141,48,2,169,116,141,49,2,169
   ,0,141,140
BV 1093 DATA 116,141,180,116,141,220,116,
   141,4,117,169,16,141,100,116,169,18,14
   1,99,116,162,21,142,138,111
LQ 1094 DATA 173,120,2,201,14,240,7,201,1
   3,240,29,76,107,118,224,81,240,45,232,
   238,100,116,169,26,205
KA 1095 DATA 100,116,208,34,238,99,116,16
   9,16,141,100,116,76,107,118,224,6,240,
   19,202,206,100,116,169,15
LG 1096 DATA 205,100,116,208,8,169,25,141
   ,100,116,206,99,116,165,20,24,105,7,19
   7,20,208,252,173,132,2
DU 1097 DATA 201,0,208,177,142,138,111,16
   9,19,141,140,116,169,5,141,136,111,173
   ,120,2,201,14,240,20,201
QO 1098 DATA 13,208,29,173,140,116,201,17
   ,240,22,206,140,116,238,136,111,76,176
   ,118,173,140,116,201,20,240
MW 1099 DATA 6,238,140,116,206,136,111,16
   5,20,24,105,30,197,20,208,252,173,132,
   2,201,0,208,200,169,16
EA 1100 DATA 141,180,116,160,160,173,120,
   2,201,14,240,20,201,13,208,29,173,180,
   116,201,16,240,22,206,180
OP 1101 DATA 116,200,200,200,76,239,118,1
   73,180,116,201,25,240,6,238,180,116,13
   6,136,136,165,20,24,105,20
FN 1102 DATA 197,20,208,252,173,132,2,201
   ,0,208,200,140,226,142,169,160,56,237,
   226,142,141,129,141,169,32
GH 1103 DATA 24,109,129,141,141,126,110,1
   41,127,110,160,0,173,129,141,10,141,12
   9,141,169,128,56,237,129,141
KQ 1104 DATA 153,96,110,200,192,14,208,24
   2,169,16,141,220,116,172,126,110,173,1
   20,2,201,14,240,20,201,13
NV 1105 DATA 208,29,173,220,116,201,16,24
   0,22,206,220,116,200,200,200,76,94,119
   ,173,220,116,201,25,240,6
HP 1106 DATA 238,220,116,136,136,136,165,
   20,24,105,20,197,20,208,252,173,132,2,
   201,0,208,200,140,126,110
BH 1107 DATA 173,220,116,56,233,16,141,12
   9,141,10,24,109,129,141,10,141,129,141
   ,169,128,56,237,129,141,141
YX 1108 DATA 110,110,169,16,141,4,117,172
   ,127,110,173,120,2,201,14,240,20,201,1
   3,208,29,173,4,117,201
MW 1109 DATA 16,240,22,206,4,117,200,200,
   200,76,188,119,173,4,117,201,25,240,6,
   238,4,117,136,136,136
AD 1110 DATA 165,20,24,105,20,197,20,208,
   252,173,132,2,201,0,208,200,140,127,11
   0,173,4,117,56,233,16
NC 1111 DATA 141,129,141,10,24,109,129,14
   1,10,141,129,141,169,128,56,237,129,14
   1,141,111,110,76,0,112,0
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EI 1 REM ******************************
WP 2 REM *  GRAND PRIX II - LISTING 3   *
EK 3 REM ******************************
NO 9 REM
DL 10 REM SAVE"D:GRANPRIX.3
BA 11 REM
EV 100 TRAP 190:SCREEN=559:POKE SCREEN,0:
   MEM=32751:LIN=0:RESTORE 1000
HX 110 FOR I=1 TO 25:READ A
VF 115 DATLINE=PEEK(183)+256*PEEK(184):LI
   N=DATLINE-1000
LL 120 POKE MEM+(LIN*25)+I,A:NEXT I
LX 130 GOTO 110
BM 190 POKE 559,34:IF PEEK(195)<>6 THEN ?
   "ERROR - CHECK TYPING":END
ID 200 IF PEEK(1792) THEN RUN "D:GRANPRIX
   .4"
HK 210 CLOAD
PR 999 END
JU 1000 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,169,152,141,244,2,169,0,141,48
JC 1001 DATA 2,169,0,141,8,210,133,8,169,
   3,141,15,210,169,135,141,49,2,160,0,17
   3,10,210,74,74
CG 1002 DATA 24,121,96,140,153,96,140,200
   ,192,16,208,239,160,0,173,10,210,74,74
   ,24,121,112,140,153,112
XM 1003 DATA 140,200,192,16,208,239,208,2
   18,162,0,169,37,141,1,210,32,32,142,0,
   0,0,0,0,0,0
AT 1010 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,112,112,112
CG 1011 DATA 112,71,32,129,112,112,2,112,
   2,112,112,112,112,2,2,112,2,112,112,11
   2,112,6,65,0,129
VS 1012 DATA 0,0,0,0,0,110,97,109,101,0,9
   9,104,97,110,103,101,0,115,99,114,101,
   101,110,0,0
CC 1013 DATA 36,50,41,54,37,50,0,16,17,0,
   95,0,42,33,45,37,51,0,51,40,53,46,52,0
   ,0
QA 1014 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,35,40,33,46,39,37,0,52,47,0
OY 1015 DATA 95,0,42,33,45,37,51,0,51,40,
   53,46,52,0,0,0,0,0,0,0,0,0,0,0
PV 1016 DATA 0,0,0,0,0,0,0,0,0,53,115,101
   ,0,106,111,121,115,116,105,99,107,0,11
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   6,111,0
OA 1017 DATA 99,104,97,110,103,101,0,108,
   101,116,116,101,114,0,0,0,0,0,0,0,0,
   0,0,97
TW 1018 DATA 110,100,0,112,114,101,115,11
   5,0,102,105,114,101,0,116,111,0,105,11
   0,112,117,116,0,0,0
KD 1019 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   48,114,101,115,115,0,37,0,116,111,0
WI 1020 DATA 101,110,116,101,114,0,110,97
   ,109,101,0,0,0,0,0,0,0,0,0,0,0,0,0,0
QP 1021 DATA 48,50,37,51,51,0,101,115,99,
   0,52,47,0,37,56,41,52,0,0,0,0,0,0,0
HU 1041 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,42,33,45,37,51,0,51,40,53,46
YW 1042 DATA 52,0,0,0,0,0,51,52,37,37,50,
   41,46,39,0,45,47,51,51,0,0,0,42,47,36
YI 1043 DATA 57,0,51,48,37,37,36,37,50,0,
   0,0,0,42,47,40,46,0,51,48,53,50,52,37,
   37
PX 1044 DATA 51,0,0,0,42,41,45,0,51,48,33
   ,50,43,0,0,0,0,0,0,0,42,33,49,53,37
AX 1045 DATA 0,52,40,37,38,37,37,52,0,0,0
   ,50,37,36,36,41,37,0,33,50,57,47,53,56
   ,0
LP 1046 DATA 0,0,48,37,43,57,0,39,50,33,5
   1,54,37,50,39,0,0,0,36,41,36,41,33,0,4
   8
RX 1047 DATA 53,44,47,54,33,0,0,0,0,33,44
   ,33,46,0,34,47,46,37,51,0,0,0,0,0,0
AK 1048 DATA 42,33,35,43,57,0,38,44,37,55
   ,33,50,52,0,0,0,33,44,33,41,46,0,38,50
   ,47
SZ 1049 DATA 51,52,0,0,0,0,0,46,37,44,51,
   47,46,0,48,41,35,43,37,52,0,0,0,46,41
XT 1050 DATA 52,41,0,44,47,53,36,37,50,0,
   0,0,0,0,48,33,53,44,0,36,33,50,43,37,5
   1
ZW 1051 DATA 0,0,0,0,0,35,40,50,41,51,0,3
   6,33,50,43,37,51,0,0,0,0,169,0,221,192
NY 1052 DATA 140,208,21,169,46,221,96,141
   ,176,14,188,64,141,200,204,138,141,240
   ,5,169,200,157,192,140,169
BO 1053 DATA 0,133,77,221,240,131,240,16,
   157,240,131,173,10,210,74,74,74,74,24,
   105,8,157,48,140,188
FM 1054 DATA 208,141,185,144,141,24,105,1
   3,141,129,141,189,80,140,56,237,129,14
   1,176,6,169,0,157,144,140
PO 1055 DATA 96,141,129,141,188,80,140,18
   9,0,142,201,10,176,237,192,160,176,15,
   192,130,176,10,192,100,176
SE 1056 DATA 5,201,5,176,221,10,10,10,10,
   205,129,141,176,212,10,205,129,141,176
   ,6,169,2,157,144,140
IK 1057 DATA 96,169,1,157,144,140,96,0,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
LG 1058 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,0,0
LI 1062 DATA 0,0,169,255,56,253,80,140,20
   1,95,144,16,201,155,144,6,56,233,128,7
   6,29,134,56,233,70
KD 1063 DATA 76,29,134,24,105,0,10,201,30
   ,240,31,201,61,240,27,201,92,240,23,20
   1,123,240,19,201,154
DU 1064 DATA 240,15,201,185,240,11,201,21
   6,240,7,201,247,240,3,76,68,134,56,233
   ,1,224,14,208,4,141
BX 1065 DATA 0,210,96,141,4,210,96,0,0,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
MV 1072 DATA 0,0,0,0,0,0,0,0,112,112,112,
   68,40,135,4,4,4,4,4,4,4,4,4,4,4
DC 1073 DATA 4,4,4,4,4,4,4,4,4,4,4,4,15,2
   ,2,65,0,135,0,0,0,0,0,0,0
BO 1074 DATA 132,87,99,87,87,235,87,87,23
   5,87,87,235,87,87,107,87,87,107,87,87,
   107,87,87,107,89
AU 1075 DATA 87,87,87,87,87,87,87,87,87,8
   7,86,91,0,0,132,85,66,87,87,235,87,87,
   235,87,87
OC 1076 DATA 235,87,87,107,87,87,107,87,8
   7,107,87,87,107,87,89,87,87,87,87,87,8
   7,87,87,86,86
HF 1077 DATA 85,86,91,0,87,87,140,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,5,84,1,0,0
CA 1078 DATA 0,0,0,0,0,0,0,0,0,0,0,0,113,
   115,122,3,87,86,0,87,86,113,114,122,0
GR 1079 DATA 0,0,0,0,4,84,84,84,84,84,84,
   1,0,0,0,0,4,86,87,87,87,87,87,87,87
MN 1080 DATA 87,86,91,0,0,0,87,87,0,87,87
   ,0,0,0,0,0,0,0,4,83,84,1,0,0,0
GL 1081 DATA 0,0,0,0,0,4,86,85,87,87,87,8
   7,87,87,87,87,87,86,91,0,0,87,87,0,87
KR 1082 DATA 87,0,0,0,0,0,0,4,83,84,1,0,0
   ,0,0,0,0,0,0,4,87,87,1,0,0
TK 1083 DATA 0,0,0,0,0,0,3,85,86,91,0,87,
   87,0,87,87,0,0,0,0,0,4,83,84,1
LF 1084 DATA 0,0,0,0,0,0,0,0,4,87,87,1,11
   3,118,122,0,0,0,0,113,117,122,3,87,86
JP 1085 DATA 0,87,87,0,87,87,0,0,0,0,4,83
   ,84,1,0,0,0,0,0,0,0,0,4,87,87
LR 1086 DATA 1,0,0,0,0,0,0,0,0,0,0,0,0,87
   ,87,0,87,87,0,87,87,0,0,0,4
PP 1087 DATA 83,84,1,0,0,0,0,0,0,0,0,4,87
   ,87,1,0,0,0,0,4,86,86,86,86,91
HT 1088 DATA 0,0,0,87,87,0,87,87,0,87,87,
   0,0,4,83,84,1,0,0,0,0,0,0,0,0
LJ 1089 DATA 4,87,87,1,0,0,0,0,4,87,87,85
   ,87,86,86,0,0,0,87,87,0,87,87,0,87
TJ 1090 DATA 87,0,4,83,84,1,0,0,0,0,0,0,0
   ,0,4,87,87,1,0,0,0,0,4,87,86
XU 1091 DATA 1,0,9,87,86,0,0,0,87,87,0,87
   ,87,0,87,87,4,83,84,1,0,0,0,0,0
NV 1092 DATA 0,0,0,4,87,87,1,0,0,0,0,4,87
   ,87,1,118,122,4,87,86,0,0,0,87,87
KD 1093 DATA 0,87,87,0,87,87,86,84,1,0,0,
   0,0,0,0,0,0,4,87,87,1,0,0,0,0
PX 1094 DATA 4,87,87,1,0,0,4,87,87,1,0,0,
   0,87,87,0,87,87,0,86,87,84,1,0,0
LI 1095 DATA 0,0,113,118,122,0,4,87,87,1,
   0,0,0,0,4,87,87,1,0,0,4,87,87,1,0
MM 1096 DATA 0,0,0,87,87,0,87,87,0,86,85,
   7,118,122,0,0,0,0,0,0,4,87,87,1,0
EM 1097 DATA 0,0,0,4,87,87,1,0,0,4,87,87,
   1,0,0,0,0,0,87,87,0,87,87,0,86
ZC 1098 DATA 87,86,86,87,87,87,87,87,87,8
   7,85,87,1,0,0,0,0,4,87,87,1,0,0,4,87
ZN 1099 DATA 87,1,0,0,0,0,0,87,87,0,87,
   87,0,131,86,87,87,87,87,87,87,87,87,87
TN 1100 DATA 86,1,0,0,0,0,4,87,87,1,0,0,4
   ,87,86,1,116,122,0,0,0,120,122,87,87
SY 1101 DATA 0,87,87,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,113,122,122,4,87,87,1,0
BO 1102 DATA 0,4,86,87,1,0,0,0,0,0,0,0,10
   ,87,86,0,87,87,0,0,0,0,0,0,0
OV 1103 DATA 0,0,0,0,0,0,0,0,0,4,87,87,1,
   0,0,0,86,86,85,86,87,87,87,87,87
BZ 1104 DATA 87,87,85,86,86,0,87,87,0,0,4
   ,86,87,87,87,87,87,87,87,87,87,87,87,8
   7,85
WK 1105 DATA 86,1,0,0,0,0,3,86,86,87,87,8
   7,87,87,87,87,87,86,86,1,0,87,87,0,4
BE 1106 DATA 86,87,87,87,87,87,87,87,87,8
   7,87,87,87,87,86,1,0,0,0,0,0,0,0,0,0
RO 1107 DATA 0,0,0,0,0,0,0,113,116,122,4,
   87,86,0,86,85,7,113,113,122,0,0,0,0,0
TU 1108 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,0,10
UV 1109 DATA 85,86,1,0,3,87,87,86,87,87,8
   7,87,87,87,87,87,87,87,87,87,87,87,87,
   87,87
KH 1110 DATA 87,87,87,87,87,87,87,87,87,8
   7,87,87,87,87,87,86,1,0,0,0,3,87,87,87
   ,87
TI 1111 DATA 87,87,87,87,87,87,87,87,87,8
   7,87,87,87,87,87,87,87,87,87,87,87,87,
   87,87,87
QG 1112 DATA 87,87,87,87,86,1,0,0,0,0,0,1
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```
   6,0,0,0,0,0,0,0,0,0,0,0,0
MG 1113 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,51,29
HI 1114 DATA 16,16,16,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,84,51,29,16,16,16,0,0
QS 1115 DATA 0,0,0,0,0,0,0,48,47,51,29,0,
   0,52,29,0,0,0,38,29,0,0,0,48,29
TL 1116 DATA 0,0,0,44,29,0,0,87,52,29,0,0
   ,0,38,29,0,0,0,48,29,0,0,0,44,29
BT 1123 DATA 0,0,0,0,0,0,0,0,0,0,0,11
   6,116,116,116,116,116,116,116,116,116,
   116,116
MS 1124 DATA 116,116,96,96,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0
IR 1127 DATA 0,0,0,0,0,0,0,0,128,128,12
   8,128,128,128,128,128,128,128,128,128,
   128,128,128,128
MU 1128 DATA 0,4,8,10,13,16,17,18,19,20,2
   8,30,32,34,32,32,0,0,0,0,0,0,0,0
YE 1129 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,255,254
SF 1130 DATA 252,251,249,248,246,245,243,
   242,240,239,237,236,234,233,0,0,0,0,0,
   0,0,0,0,0,0
XS 1133 DATA 0,0,0,2,2,2,2,2,2,2,2,2,2,2,
   2,2,2,2,2,0,0,0,0,0,0
NS 1134 DATA 0,0,0,0,0,0,0,0,0,0,65,104,6
   2,101,59,98,56,95,53,92,50,89,47,86,44
SU 1135 DATA 83,135,135,135,135,135,135,1
   35,135,135,135,135,135,135,135,135,135
   ,87,87,87,87,87,87,87,87
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EI 1 REM ********************************
XX 2 REM *  GRAND PRIX II - LISTING 4  *
EK 3 REM ********************************
NO 9 REM
EJ 10 REM SAVE"D:GRANPRIX.4
BA 11 REM
BF 100 TRAP 190:SCREEN=559:POKE SCREEN,0:
   MEM=36151:LIN=0:RESTORE 1000
HX 110 FOR I=1 TO 25:READ A
VF 115 DATLINE=PEEK(183)+256*PEEK(184):LI
   N=DATLINE-1000
LL 120 POKE MEM+(LIN*25)+I,A:NEXT I
LX 130 GOTO 110
BM 190 POKE 559,34:IF PEEK(195)<>6 THEN ?
   "KKERROR - CHECK TYPING":END
XV 200 ? CHR$(125):? "KK  Program finish
   ed and resident in        memory. Check
   article for               instructions";
UG 210 ? " to save to tape             or di
   sk.":? :? "IMPORTANT: DO NOT SWITCH OF
   F MACHINE!"
PR 999 END
JL 1000 DATA 87,87,87,87,87,87,87,87,0,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
LY 1002 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,1,0
QH 1003 DATA 0,0,0,0,2,5,0,21,0,0,0,0,0,1
   30,140,110,100,60,40,80,150,160,160,60
   ,120
QK 1004 DATA 240,120,240,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,11,20,35,15,12
TI 1005 DATA 10,9,13,10,12,10,13,23,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0,0,0
SB 1007 DATA 0,0,0,0,0,0,0,0,0,7,7,7,7,7,
   7,7,7,7,7,7,7,7,7,7,7
OF 1008 DATA 32,32,32,32,32,32,32,32,32,3
   2,32,32,32,32,32,32,0,0,0,0,0,0,0,0,0
FF 1009 DATA 0,0,0,0,0,0,0,169,0,205,133,
   2,240,5,162,15,76,74,145,173,252,2,201
   ,33,240
JF 1010 DATA 249,201,62,208,10,172,206,14
   0,192,0,208,3,141,206,140,201,10,208,1
   0,172,207,140,192,0,208
GA 1011 DATA 3,141,207,140,201,28,208,3,7
   6,205,147,201,22,208,5,162,14,76,74,14
   5,169,255,141,252,2
YV 1012 DATA 232,224,16,208,2,162,0,224,1
   ,208,10,164,20,204,128,141,240,245,140
   ,128,141,169,0,205,137
YZ 1013 DATA 141,240,3,32,192,150,188,32,
   141,192,0,240,162,188,0,141,192,0,240,
   11,169,0,157,80,140
JK 1014 DATA 222,0,141,76,44,142,188,208,
   141,185,144,141,201,240,208,5,169,0,15
   7,192,140,188,192,140,192
KN 1015 DATA 0,240,3,32,0,149,224,14,144,
   12,169,52,221,112,141,208,5,169,1,157,
   144,140,188,144,140
BP 1016 DATA 192,1,240,80,192,2,240,103,2
   54,16,140,188,16,140,192,0,208,3,254,1
   12,141,189,112,140,24
CR 1017 DATA 105,160,125,128,140,221,80,1
   40,144,46,189,96,140,24,125,128,140,12
   5,64,140,157,64,140,144,31
IZ 1018 DATA 254,80,140,188,80,140,192,55
   ,240,12,192,100,240,8,192,140,240,4,19
   2,170,208,9,189,96,140
BT 1019 DATA 56,233,15,157,96,140,76,107,
   143,169,0,221,80,140,208,3,76,107,143,
   56,189,64,140,233,70
QZ 1020 DATA 157,64,140,176,232,222,80,14
   0,76,79,143,169,0,221,80,140,208,3,76,
   107,143,254,80,141,221
ER 1021 DATA 80,141,208,3,254,96,141,222,
   80,140,188,80,140,192,54,240,12,192,99
   ,240,8,192,139,240,4
NR 1022 DATA 192,169,208,9,189,96,140,24,
   105,15,157,96,140,224,14,208,3,76,175,
   143,224,15,208,3,76
NH 1023 DATA 235,143,32,0,133,224,13,208,
   44,169,0,205,46,141,208,37,162,14,173,
   109,141,141,110,141,173
HW 1024 DATA 93,140,141,94,140,173,77,141
   ,141,78,141,173,173,140,141,174,140,20
   6,174,140,206,77,141,160,0
HF 1025 DATA 76,39,144,76,5,145,173,132,2
   ,201,0,208,6,157,144,140,76,216,143,16
   9,1,157,144,140,173
AG 1026 DATA 120,2,201,13,240,11,201,5,24
   0,7,201,9,240,3,76,216,143,169,2,157,1
   44,140,160,0,169
BI 1027 DATA 52,221,112,141,208,70,169,0,
   221,80,140,208,63,76,74,145,173,133,2,
   201,0,208,6,157,144
VL 1028 DATA 140,76,20,144,169,1,157,144,
   140,173,121,2,201,13,240,11,201,5,240,
   7,201,9,240,3,76
OM 1029 DATA 20,144,169,2,157,144,140,160
   ,20,169,52,221,112,141,208,10,169,0,22
   1,80,140,208,3,76,74
OZ 1030 DATA 145,142,129,141,152,170,172,
   129,141,185,80,140,217,128,141,240,94,
   144,45,185,128,141,24,105,1
VT 1031 DATA 153,128,141,254,20,139,169,2
   6,221,20,139,208,73,169,16,157,20,139,
   254,19,139,169,26,221,19
VM 1032 DATA 139,208,58,169,16,157,19,139
   ,254,18,139,76,149,144,185,128,141,56,
   233,1,153,128,141,222,20
YH 1033 DATA 139,169,15,221,20,139,208,28
   ,169,25,157,20,139,222,19,139,169,15,2
   21,19,139,208,13,221,18
GG 1034 DATA 139,240,8,169,25,157,19,139,
   222,18,139,142,129,141,152,170,173,129
   ,141,24,105,40,168,169,55
NV 1035 DATA 56,253,96,141,32,0,151,169,5
   2,56,253,112,141,32,0,151,169,1,141,13
   2,141,189,64,141,140
DL 1036 DATA 129,141,160,255,192,15,240,3
   1,200,217,64,141,240,8,176,244,238,132
   ,141,76,192,144,189,160,140
ZO 1037 DATA 217,160,140,176,3,238,132,14
   1,189,64,141,76,192,144,172,129,141,17
   3,132,141,32,0,151,189,64
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WO 1038 DATA 141,32,0,151,224,14,208,15,1
69,0,205,46,141,208,8,157,64,141,162,1
3,254,64,141,169,0
AB 1039 DATA 221,48,140,240,8,222,48,140,
169,2,157,144,140,189,208,140,24,125,8
0,140,157,208,140,144,19
WF 1040 DATA 254,224,140,189,224,140,205,
136,141,208,8,169,0,157,224,140,76,54,
145,76,44,142,254,80,141
AJ 1041 DATA 169,0,221,80,141,208,3,254,9
6,141,169,54,221,96,141,176,40,189,16,
141,141,73,151,189,32
TJ 1042 DATA 141,141,74,151,189,48,141,32
,72,151,169,0,157,32,141,169,255,141,1
37,141,224,15,208,5,169
FL 1043 DATA 0,141,5,210,76,44,142,189,12
8,140,201,0,240,6,56,233,3,157,128,140
,189,16,141,141,251
DC 1044 DATA 151,189,32,141,141,252,151,1
89,240,140,141,254,151,32,80,151,141,1
31,141,201,87,208,3,76,194
GI 1045 DATA 147,201,85,208,3,76,229,146,
201,89,208,3,76,78,147,201,64,144,80,2
01,240,176,76,201,71
NX 1046 DATA 176,10,168,169,12,157,128,14
0,152,76,223,145,201,97,144,58,201,112
,176,10,168,169,12,157,128
QK 1047 DATA 140,152,76,223,145,201,233,1
44,40,168,169,12,157,128,140,152,169,3
,221,0,142,144,26,188,208
HP 1048 DATA 141,169,240,217,144,141,240,
16,169,255,157,208,140,172,136,141,136
,152,157,224,140,76,44,142,189
QY 1049 DATA 16,141,141,251,151,189,32,14
1,141,252,151,238,254,151,169,8,205,25
4,151,208,5,169,0,141,254
RZ 1050 DATA 151,32,80,151,141,131,141,20
1,87,208,3,76,194,147,201,85,208,3,76,
229,146,201,89,208,3
CR 1051 DATA 76,78,147,189,16,141,141,251
,151,189,32,141,141,252,151,189,240,14
0,141,254,151,206,254,151,169
GQ 1052 DATA 255,205,254,151,208,5,169,7,
141,254,151,32,80,151,141,131,141,201,
87,208,3,76,194,147,201
EC 1053 DATA 85,240,125,201,89,240,199,16
9,60,221,32,140,208,95,189,16,141,141,
251,151,189,32,141,141,252
AE 1054 DATA 151,188,240,140,136,136,192,
255,208,2,160,7,192,254,208,2,160,6,14
0,254,151,32,80,151,141
YJ 1055 DATA 131,141,201,87,240,46,201,85
,240,68,189,16,141,141,251,151,189,32,
141,141,252,151,188,240,140
GR 1056 DATA 200,200,192,8,208,2,160,0,19
2,9,208,2,160,1,140,254,151,32,80,151,
141,131,141,201,87
II 1057 DATA 208,3,76,194,147,201,85,240,
19,169,255,157,208,140,172,136,141,136
,152,157,224,140,254,32,140
DC 1058 DATA 76,44,142,188,208,141,189,80
,140,254,208,141,217,144,141,144,22,24
9,144,141,10,141,129,141,189
IR 1059 DATA 80,141,24,109,129,141,157,80
,141,144,3,254,96,141,188,208,141,185,
176,141,157,0,142,224,14
PV 1060 DATA 144,29,173,129,141,201,65,14
4,4,74,157,48,140,169,45,221,96,141,17
6,8,173,129,141,24,74
PH 1061 DATA 157,48,140,76,194,147,142,12
9,141,169,20,56,237,129,141,10,141,129
,141,173,10,210,205,129,141
TQ 1062 DATA 176,232,157,240,131,76,194,1
47,169,17,141,129,141,160,255,189,64,1
41,200,192,16,240,11,217,64
SC 1063 DATA 141,176,246,238,129,141,76,8
8,147,173,129,141,201,26,144,2,169,93,
141,54,139,169,0,157,208
OE 1064 DATA 141,157,160,140,188,208,141,
185,176,141,157,0,142,254,64,141,173,1
38,141,221,64,141,208,50,172
FG 1065 DATA 130,141,138,153,224,141,238,
130,141,189,16,141,141,73,151,189,32,1
41,141,74,151,169,87,32,72
RP 1066 DATA 151,169,0,157,32,141,160,0,2
00,192,16,240,8,217,32,141,240,246,76,
44,142,76,205,147,32
UT 1067 DATA 0,148,169,0,157,32,140,76,44
,142,162,0,189,16,141,141,73,151,189,3
2,141,201,0,240,9
PL 1068 DATA 141,74,151,189,48,141,32,72,
151,232,224,16,208,229,96,208,248,205,
129,141,176,173,169,2,157
PE 1069 DATA 144,140,96,0,0,0,0,0,0,0,0,1
89,16,141,141,73,151,189,32,141,141,74
,151,189,48
PT 1070 DATA 141,32,72,151,173,251,151,15
7,16,141,141,73,151,173,252,151,157,32
,141,141,74,151,173,254,151
AO 1071 DATA 157,240,140,173,131,141,157,
48,141,224,14,240,48,224,15,240,53,224
,7,144,20,169,0,205,46
KF 1072 DATA 141,208,4,224,10,176,29,169,
105,24,125,240,140,76,115,148,169,0,20
5,47,141,208,4,224,3
BG 1073 DATA 144,18,169,233,24,125,240,14
0,76,115,148,169,97,24,125,240,140,76,
115,148,169,64,24,125,240
BU 1074 DATA 140,32,72,151,254,160,140,22
2,0,142,96,0,0,0,0,0,0,0,0,0,0,0,0,0
JJ 1079 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,189,48,141,201,83,208,3,76
ET 1080 DATA 65,150,169,1,221,192,140,208
,43,169,60,221,80,140,176,8,169,1,157,
144,140,76,37,149,169
GK 1081 DATA 0,157,144,140,188,224,140,20
0,204,136,141,208,74,189,48,141,201,84
,240,79,201,87,208,3,76
PK 1082 DATA 53,150,189,16,141,141,251,15
1,189,32,141,141,252,151,189,240,140,1
41,254,151,238,254,151,160,8
EC 1083 DATA 204,254,151,208,5,169,0,141,
254,151,32,80,151,201,84,240,21,238,25
4,151,204,254,151,208,5
ZO 1084 DATA 169,0,141,254,151,32,80,151,
201,84,240,1,96,141,131,141,169,1,157,
192,140,76,44,150,189
DH 1085 DATA 16,141,141,251,151,189,32,14
1,141,252,151,189,240,140,168,136,192,
255,208,2,160,0,140,254,151
RJ 1086 DATA 32,80,151,141,131,141,201,83
,240,11,201,84,240,4,201,87,208,13,76,
44,150,188,96,141,192
MZ 1087 DATA 0,240,238,76,44,150,189,16,1
41,141,251,151,189,32,141,141,252,151,
238,254,151,169,8,205,254
XT 1088 DATA 151,208,5,169,0,141,254,151,
32,80,151,141,131,141,201,83,240,11,20
1,84,240,14,201,87,240
NP 1089 DATA 10,76,247,149,188,96,141,192
,0,240,238,76,44,150,189,16,141,141,25
1,151,189,32,141,141,252
LU 1090 DATA 151,238,254,151,169,8,205,25
4,151,208,5,169,0,141,254,151,32,80,15
1,141,131,141,201,83,240
VC 1091 DATA 9,201,84,240,12,201,87,240,8
,96,188,96,141,192,0,240,240,169,0,157
,224,140,32,0,148
YU 1092 DATA 96,173,135,141,157,240,140,1
69,0,157,192,140,96,169,0,157,224,140,
221,80,140,240,6,169,2
PY 1093 DATA 157,144,140,96,169,0,221,96,
141,208,10,189,176,140,197,19,208,22,7
6,60,149,157,96,141,157
SW 1094 DATA 112,141,164,19,200,200,196,2
0,176,1,200,152,157,176,140,96,0,0,0,0
,0,0,0,0,0
BE 1095 DATA 0,169,255,56,253,80,140,201,
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   95,144,16,201,155,144,6,56,233,128,76,
   157,150,56,233,70,76
DD 1096 DATA 157,150,24,105,0,10,224,14,2
   08,3,141,0,210,96,0,0,0,0,0,0,0,0,0,0,
   0
OV 1097 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,96,0,0,0,0,0,0,0,0,0
MG 1100 DATA 0,0,0,0,72,169,16,141,129,14
   1,104,201,10,144,9,56,233,10,238,129,1
   41,76,7,151,72
DZ 1101 DATA 173,129,141,153,18,139,200,1
   04,24,105,16,153,18,139,152,24,105,4,1
   68,76,0,134,0,0,0
SP 1102 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,173,224,132,96,0,0,0
AZ 1103 DATA 0,141,170,96,96,0,0,0,0,173,
   254,151,201,0,240,44,201,1,240,57,201,
   2,240,70,201
DJ 1104 DATA 3,240,82,201,4,240,95,201,5,
   240,108,201,6,240,121,173,251,151,56,2
   33,41,141,251,151,176
WO 1105 DATA 3,206,252,151,76,245,151,173
   ,251,151,173,251,151,56,233,40,141,251
   ,151,176,3,206,252,151,76
WC 1106 DATA 245,151,173,251,151,56,233,3
   9,141,251,151,176,3,206,252,151,76,245
   ,151,238,251,151,169,0,205
QD 1107 DATA 251,151,208,3,238,252,151,76
   ,245,151,173,251,151,24,105,41,141,251
   ,151,144,3,238,252,151,76
BW 1108 DATA 245,151,173,251,151,24,105,4
   0,141,251,151,144,3,238,252,151,76,245
   ,151,173,251,151,24,105,39
NN 1109 DATA 141,251,151,144,3,238,252,15
   1,76,245,151,206,251,151,169,255,205,2
   51,151,208,3,206,252,151,76
QV 1110 DATA 250,151,0,0,173,206,138,96,6
   ,0,0,0,0,0,0,0,0,85,85,84,84,80,80,6
   4
NH 1111 DATA 0,0,102,102,102,0,0,0,0,85,8
   5,21,21,5,5,1,0,0,1,5,5,21,21,85,85
ZH 1112 DATA 21,5,1,1,1,1,5,21,0,0,0,0,0,
   65,65,85,84,80,64,64,64,64,80,84,85
ZU 1113 DATA 65,65,0,0,0,0,0,85,21,5,5,1,
   1,1,0,0,0,1,1,1,5,5,21,0,0
QX 1114 DATA 64,64,64,80,80,84,84,80,80,6
   4,64,64,0,0,0,0,0,126,0,0,0,0,0,0,0
BC 1115 DATA 0,0,24,24,0,0,0,0,0,0,0,0,
   0,60,102,110,118,102,60,0,0,24,56,24
VQ 1116 DATA 24,24,126,0,0,60,102,12,24,4
   8,126,0,0,126,12,24,12,102,60,0,0,12,2
   8,60,108
ZN 1117 DATA 126,12,0,0,126,96,124,6,102,
   60,0,0,60,96,124,102,102,60,0,0,126,6,
   12,24,48
HU 1118 DATA 48,0,0,60,102,60,102,102,60,
   0,0,60,102,62,6,12,56,0,0,0,24,24,0,24
   ,24
HU 1119 DATA 0,0,0,24,24,0,24,24,48,6,12,
   24,48,24,12,6,0,0,0,126,0,0,126,0,0
IB 1120 DATA 96,48,24,12,24,48,96,0,0,60,
   102,12,24,0,24,0,0,60,102,110,110,96,6
   2,0,0
DP 1121 DATA 24,60,102,102,126,102,0,0,12
   4,102,124,102,102,124,0,0,60,102,96,96
   ,102,60,0,0,120
QP 1122 DATA 108,102,102,108,120,0,0,126,
   96,124,96,96,126,0,0,126,96,124,96,96,
   96,0,0,62,96
JV 1123 DATA 96,110,102,62,0,0,102,102,12
   6,102,102,102,0,0,126,24,24,24,24,126,
   0,0,6,6,6
RN 1124 DATA 6,102,60,0,0,102,108,120,120
   ,108,102,0,0,96,96,96,96,96,126,0,0,99
   ,119,127,107
FC 1125 DATA 99,99,0,0,102,118,126,126,11
   0,102,0,0,60,102,102,102,102,60,0,0,12
   4,102,102,124,96
WY 1126 DATA 96,0,0,60,102,102,102,108,54
   ,0,0,124,102,102,124,108,102,0,0,60,96
   ,60,6,6,60
XW 1127 DATA 0,0,126,24,24,24,24,24,0,0,1
   02,102,102,102,102,126,0,0,102,102,102
   ,102,60,24,0
BQ 1128 DATA 0,99,99,107,127,119,99,0,0,1
   02,102,60,60,102,102,0,0,102,102,60,24
   ,24,24,0,0
YY 1129 DATA 126,12,24,48,96,126,0,0,30,2
   4,24,24,24,30,0,0,64,96,48,24,12,6,0,0
   ,120
PD 1130 DATA 24,24,24,24,120,0,0,8,28,54,
   99,0,0,0,0,0,0,0,0,0,255,0,85,17,1
KQ 1131 DATA 69,1,1,17,85,85,69,65,64,0,1
   ,65,81,85,21,17,1,1,17,21,85,81,65,65,
   0
TB 1132 DATA 0,65,69,69,85,64,64,81,81,64
   ,68,85,85,69,69,64,0,1,65,81,85,84,68,
   64,64
HQ 1133 DATA 68,84,85,81,81,65,0,0,65,65,
   69,85,85,85,85,85,85,85,85,85,85,85,85
   ,85,85
FS 1134 DATA 85,85,85,85,85,85,85,85,85,8
   5,85,85,85,85,85,85,85,85,85,85,85,85,
   85,85,85
FW 1135 DATA 85,85,85,85,85,85,85,85,85,8
   5,85,85,85,85,85,85,85,85,85,85,85,85,
   85,85,85
GA 1136 DATA 85,85,85,85,85,85,85,85,85,8
   5,85,85,85,85,85,85,85,85,85,85,85,85,
   85,85,85
GE 1137 DATA 85,85,85,85,85,85,85,85,85,8
   5,85,85,85,85,85,85,85,85,85,85,85,85,
   85,85,85
PK 1138 DATA 85,85,85,85,85,85,85,85,85,8
   5,85,85,85,85,24,24,24,255,255,0,0,0,7
   3,97,97
UP 1139 DATA 73,73,97,97,73,85,85,85,85,3
   4,136,85,85,0,64,80,80,84,84,84,85,0,2
   4,60,126
NJ 1140 DATA 24,24,24,0,0,24,24,24,126,60
   ,24,0,0,24,48,126,48,24,0,0,0,24,12,12
   6,12
TD 1141 DATA 24,0,0,0,24,60,126,126,60,24
   ,0,33,101,101,169,169,33,33,85,69,73,4
   1,41,104,104
EB 1142 DATA 97,81,85,69,68,106,106,68,69
   ,85,81,97,104,104,41,41,73,69,85,72,72
   ,106,106,89,89
JM 1143 DATA 72,69,69,41,41,104,104,81,81
   ,85,81,17,169,169,17,81,85,81,81,104,1
   04,41,41,73,69
SW 1144 DATA 49,117,117,253,253,49,49,85,
   85,81,61,60,253,241,113,85,85,69,76,12
   7,127,76,69,85,85
WS 1145 DATA 113,49,61,253,124,76,69,85,7
   6,76,127,127,93,93,76,69,77,127,127,60
   ,124,69,85,85,81
XN 1146 DATA 49,253,253,49,81,85,81,49,61
   ,127,252,76,77,85,0,8,40,8,8,8,42,0,0,
   42,34
EF 1147 DATA 2,10,40,42,0,0,42,2,10,2,2,4
   2,0,0,2,10,40,34,42,2,0,0,42,32,42
LL 1148 DATA 2,34,42,0,0,10,40,32,42,34,4
   2,0,0,42,2,10,8,8,8,0,0,42,34,42,34
TC 1149 DATA 34,42,0,0,42,34,42,2,2,2,0,0
   ,42,34,34,34,34,42,0,0,24,60,126,126,2
   4
QI 1150 DATA 60,0,24,24,24,24,24,24,24,24
   ,0,126,120,124,110,102,6,0,8,24,56,120
   ,56,24,8
NS 1151 DATA 0,16,24,28,30,28,24,16,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,0,0,0
```

```
QO 5 REM DISK LOADER FOR GRAND PRIX II
KT 10 OPEN #1,4,0,"D:GP.OBJ"
IL 20 POKE 850,7
HA 30 POKE 852,250:POKE 853,91
RO 40 POKE 856,255:POKE 857,255
SO 50 X=USR(ADR("hhh▒LV▒"),16)
QW 60 CLOSE #1:A=USR(28672)
```

Listing 5

```
OY 10 REM  CASSETTE LOADER PROGRAM
WI 11 REM  for  GRANDPRIX II
AG 20 OPEN #1,4,128,"C:"
XJ 30 FOR X=23296 TO 39936:GET #1,A:POKE
   X,A:NEXT X
DH 40 CLOSE #1:Z=USR(28672)
```

Listing 6

```
SJ 10 REM  CASSETTE SAVER PROGRAM
HK 11 REM  for  GRANDPRIX II
CC 20 OPEN #1,8,128,"C:"
MD 30 FOR X=23296 TO 39936:A=PEEK(X):PUT
   #1,A:NEXT X
LK 40 CLOSE #1
```

Listing 7



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ONE OF THESE COULD BE YOURS

HOW?

By writing an article or sending a program to PAGE 6

During 1985 we will be giving away an AtariWriter cartridge to the author of the best article published in each issue and a Paint cartridge to the author of the best program submitted. All contributions will be re-considered prior to publication of each issue so that if you do not receive the award for a particular issue, your article or program will still be in the running for the next issue. In addition to this all articles or programs published will still be eligible for awards in the annual Readers Poll so it really is worth writing an article or sending in a program.

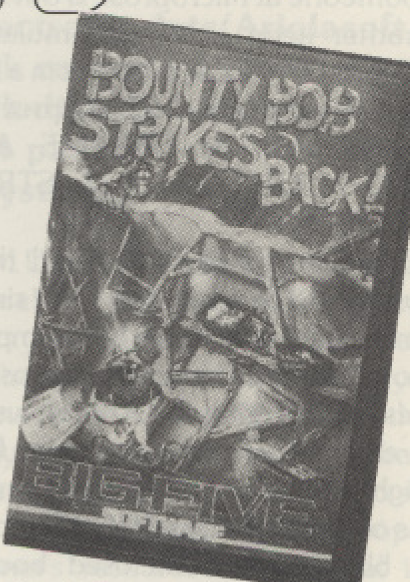
Articles may be on any subject of interest to Atari users and should be at least one magazine page length. Diagrams, charts, illustrations or even photographs(!) may be included if you wish. Programs can be for any memory size and may be games, utilities or more serious programs provided they are of general interest. If possible please submit articles and programs on a DOS 2.0 or DOS 2.5 disk (which will be returned or replaced if requested by a disk from the PAGE 6 Library). Any DOS 2.0 compatible word processor may be used. If you do not have a disk drive, please use cassette but ensure that TWO copies are recorded, one of which should use LIST "C:". Hard copy listings of programs are NOT required but documentation explaining how to use the program should be included. Typewritten or handwritten articles are still welcome if you cannot manage disk or cassette and will be given equal consideration. Written program listings will not however be accepted. Come on, let's see your articles and programs. Best of luck!

This issue the award of a PAINT program goes to Chris Darkes for his splendid Grand Prix II. The ATARIWRITER award has been held over for YOUR contribution. It would have gone to Steve Pedler but he got one last issue!

SHORT REVIEWS



Jim Short reviews some recent releases



BOUNTY BOB STRIKES BACK

Big Five (U.S.GOLD)
64k cassette (NOT 400/800) £9.95
48k disk £14.95
1 player/joystick

This game is, in effect, the follow up to the enormously popular MINER 2049er. It has taken some considerable time for MINER's successor to appear - the original Big5 game is well over two years old - but, in between we had the elusive Scraper Caper which failed to see the light of day. Still, not to worry, Bounty Bob is back, bigger and better than ever before in this latest game from U.S.GOLD and the good news is that it retails on cassette and disk at sensible prices. You won't have to fork out £50 for the ROM version.

Most of you will be already be familiar with the scenario of the original MINER game. BOUNTY BOB follows a similar plot as our intrepid hero embarks on a journey covering 25 exciting new levels in his bid to secure the mine and defeat the plans of the evil Yukon Yohan (whoever he may be!).

Gameplay is virtually identical to the original. You must guide Bob around the platform levels, filling in all the sections of the framework in order to 'claim' them. Deadly mutants patrol the framework and you can either avoid them by jumping over them or destroy them by collecting one of the many 'treats' scattered throughout the mine and then touching the mutants.

Bob still retains his incredible jumping powers from the previous game but, unlike MINER, you can vary the delay between pressing the fire button and directing the joystick and thus control his jumping distance. This greatly enhances the playability of the game. All the old familiar objects and modes of transport are there to both help and hinder Bob - transporters, pulverisers, lifts and of course, the cannon and there are a whole batch of new ones waiting to be discovered and explored such as the gravity lift, grain elevator, suction tubes, mobile suction unit, acid rain, utility hoist and a host of other wierd and wonderful contraptions.

First impressions are generally important and the title screen is a mere taster of what is to follow. A flock of birds fly on carrying the letters of the alphabet and they quickly re-arrange them onto a huge 'billboard' affair to spell out the opening credits. The accompanying tune is excellent and sounds suspiciously like a re-working of the Superman and Star Wars themes.

The high score table is another eye-opener. You must spell your name by pushing letters onto a conveyor-belt with the aid of a pair of bulldozers, whereupon the birds swoop down and transfer your name and score to the High Score billboard. The fun starts when your name is added to an otherwise full High Score table as the birds have to fit you into the correct slot whilst re-arranging all the other names and scores in their proper order. Clever birds these ones!

My main gripe concerning the original MINER game was that it was just too difficult, especially for someone of my limited skills. No such problems with BOUNTY BOB though, an 'Options' Screen, allows you to alter numerous game parameters to make the game as easy or as hard as you like. You can choose to start the game with up to 4 lives, set the bonus life to be awarded anywhere from 10,000 to 90,000 points, re-start the game at the point you left off after losing a life, enable 'secret messages' which allow you to 'warp' to higher levels and so on.

It would be no great shakes to write a book about this game but, naturally, magazine space won't allow it. The graphics and animation are superb and the quality and variety of the 25 levels are unsurpassed in any other platform game I've seen. Colour has been used to great effect with the mine levels constantly changing colour each time you play. Sound effects are also first rate.

Normally, at this point, reviewers quote the tired old cliche that 'follow-up games are never as good as the original' but in this case it couldn't be farther from the truth. BOUNTY BOB STRIKES BACK is as important to your collection as STAR RAIDERS and POLE POSITION were. Mark my word, it is destined to become the number one game of 1985. Miss it at you own peril!

One final note. The cassette version of BOUNTY BOB is only compatible with the XL and XE models as it requires 64k RAM. Owners of 400/800 models will have to settle for the 48k disk version.

MIG ALLEY ACE



Microprose (U.S.GOLD)
48k disk £14.95
48k cassette £9.95
1/2 players
Joystick(s)

Someone at Microprose is obviously rather keen on flight simulators. MIG ALLEY ACE is the latest in a long line, following in the wake of previous releases such as SPITFIRE ACE, SOLO FLIGHT and F-15 STRIKE EAGLE.

There seems to be a trend these days toward combat-style flight simulators and this one, as the name implies, is no exception. The action supposedly takes place during the Korean war of the early 1950's where inferior U.N. jetfighters took on the mighty squadrons of North Korean MIG-15's, or so the blurb in the enclosed booklet says!

You have a choice of three different game options, 1 player solo, 2 player head-to-head or 2 player co-operative. The screen is split into two separate cockpit views, the top being player one's cockpit view and the bottom player two's or the computer's depending on your game choice. This is slightly unusual for this type of game and takes a bit of getting used to at first.

The simulation covers several different combat scenarios. You have 3 lives in which to try and battle your way right through the card and, afterwards, you are accorded a rank based on how well you fared in battle. The ranks go from Novice through to WGFP (World's Greatest Fighter Pilot).

As flight simulators go, MIG ALLEY ACE is something of a let-down, particularly in the graphics department. All the action takes place in the air with no facility for taking-off or landing and control is almost entirely from the joystick with the bare minimum of keyboard input. As a result, the game is best suited to complete beginners and a good idea would be to use it as a flight trainer before moving on to something more complex such as the brilliant F-15 STRIKE EAGLE.

Sadly, the Atari version of MIG ALLEY ACE loses out to the C64 one. The cockpit view is much more realistic on the 64 version with a proper cockpit canopy and an authentic rotary-dial instrument display. The Atari version is more like a view out of a plate-glass window and the digital instrument bar is about as unrealistic as they come. The Atari is capable of a far superior display to that of the Commodore as Microprose have already shown with their versions of SOLO FLIGHT and F-15 STRIKE EAGLE and I honestly cannot understand why they should purposely make Atari the poor relation this time. Let's hope Microprose don't repeat this in any forthcoming releases.

KISSIN' KOUSINS



English Software
48k cassette £6.95
48k disk £9.95
1 player
Joystick

I must admit to having a soft spot for English Software. AIRSTRIKE was the first cassette game I ever purchased and it is still one of my 'all time' favourites. I was a mite disappointed when they seemingly stopped supporting Atari a short time ago (though I daresay they had their reasons), but now they are back again with some new titles. The first of these is KISSIN' KOUSINS and it has the distinction of being the first all-UK release to feature digitised speech. When the program loads you are greeted by a clear and precise voice announcing 'English Software presents Kissin' Kousins'. An impressive start. Unfortunately, the game fails to live up to the opening sequence.

You control a cute little character who is desperately trying to save his Kissin' Kousin although it doesn't say who from. You must guide him through various street scenes, jumping over the many objects lining his path and avoiding the bombs being dropped from above. Stationary objects are easily dealt with but in subsequent scenes you will encounter moving caterpillars, kangaroos, bats, rubber frogs, gogglers and pogopoppers all of which combine to make the going really tough (I never once made it past those pesky kangaroos!).

Graphics are nice and colourful if - dare I say it - somewhat Spectrumish in appearance but a lot more thought could have gone into the actual game. As things stand, it takes second place to the gimmicky intro.

English Software may well be forever judged on the standards set by JET BOOT JACK, however they do have other good titles such as LEGEND OF THE KNUCKERHOLE, SOLDIER'S FORTUNE and HENRY'S HOUSE just waiting to be converted to the Atari. How about it English Software?

HIJACK



English Software
48k cassette £6.95
1 player
Joystick

HIJACK is yet another new title from English Software. It is a helicopter rescue game along the same lines as CHOPLIFTER only, in this game, you must rescue VIP passengers from the roof of a high speed train and deposit them to safety in the rear security carriage.

A nifty little jingle accompanies the opening title screen, clever compositions like this being a traditional feature of many English Software games. A quick press of the START key and it's on with the action. The train is speeding across the bottom of the screen from right to left and you must swoop down in your chopper and pick up the VIP's who are running about on the roof of the train, waving frantically at you. Press the fire button to lower the rope and, once the figure has taken a firm hold, transport him back to the safety of the rear carriage. Simple, eh? Well, not quite. I forgot to tell you about the cannons firing at you from the hills and the huge trees that line the sides of the track and which you almost always fly into, or at least I do! Once all the 10 VIP's have been rescued you move onto the next level of play where gunfire from openings on the roof of the train is a further hazard.

I like this game. It has clear, colourful graphics, good sounds and some excellent special effects. The way your helicopter bursts into a flaming fireball when it collides with a tree or is hit by a missile is incredibly realistic. Worth £6.95 of anybody's money.

ARCHON

Electronic Arts/Ariolasoft
48k cassette £11.95
48k disk £14.95
1/2 players
Joystick(s)

ARCHON has been available for quite some time on import, at import prices, but is now being marketed in the UK by Ariolasoft on both cassette (previously unavailable) and disk so it is worthwhile taking another look at it.

ARCHON is a unique sort of game. Whilst the basic theme has been borrowed from mythical folklore, the game itself offers a whole new concept in computer programs combining the strategy of conventional board games such as chess with the high speed action associated with arcade style games.

There are two sides - the Light and the Dark - each containing 18 pieces or 'icons'. These take the form of legendary creatures such as dragons, unicorns, basilisks, manticores, trolls, banshees and shapeshifters. The sides are balanced in strength but are not identical. Each icon has its own distinct weaponry and attacking strength and therefore some icons are superior to others. The most powerful icons are the Wizard, who leads the white side and the evil Sorceress who commands the forces of the Dark side.

The board layout is very similar to that of a chessboard with certain interesting differences. Whilst some of the board squares retain their normal black or white colouring for the duration of the game. other 'luminance' squares alternate back and forth between varying shades of black, grey and white. As icons have a power advantage on squares of their own colour, the luminance cycle must be closely monitored so that you can attack your opponent when the square is in your favour.

There are 5 red 'power points' situated at strategic places on the luminance squares. These heal injured icons and also protect them from the effects of magic spells. To win the game, a player must destroy all of his opponent's icons or occupy all 5 power points with his own icons. In practice, the latter option is the more difficult of the two.

All movement is joystick controlled.



The icons are moved with the aid of a 'target frame' and their movement from square to square is along the same lines as chess but also depends on whether the icon involved is a 'Ground' mover or 'Fly' mover. Fly movers can jump over occupied squares whilst Ground movers cannot.

Sounds fairly routine, maybe even a little boring so why has Archon received so much praise? Well, ARCHON didn't gain its reputation by being a mere chess clone. The fun begins when you invade a square occupied by an opposing icon. You don't automatically claim that square as you do in chess, you must fight for it first!

When two icons come face to face on any square on the strategy board, that square immediately pans out to fill the entire screen and forms the Combat Arena. It is now a fight to the death with the victor gaining the right to occupy that square on the board. Various moving obstacles add interest to the arena battles but they are also pretty useful for dodging behind in order to escape your opponent's missiles. The Wizard and the Sorceress can call up a number of different spells in order to enhance the enjoyment and playability of the game. The individual spells can only be cast once, so it is best to use them wisely.

The graphics in ARCHON are truly outstanding, particularly in the combat arena where the icons fairly 'come alive'. A word must also be said here about the packaging which is of a very high standard and includes a well-written and thoroughly absorbing instruction booklet, complete with many game diagrams and drawings.

ARCHON can be played either against the computer or a human opponent. The computer plays a reasonable game but tends to be somewhat predictable and, after a short while, becomes rather easy to beat. An 'adept' version is now available in the States where the computer plays a much slicker game, however the game only really comes alive when you play against a friend. Two player ARCHON is the meanest head-to-head confrontation this side of Middle Earth. If you haven't already bought it, then do so now. You won't regret it.

M.U.L.E.

Electronic Arts/Ariolasoft
48k cassette £11.95
48k disk £14.95
1/4 players
Joystick(s)

M.U.L.E. is a strategy game based loosely on the game of 'Kingdom'. It puts you and up to three fellow players (although the lack of extra joystick ports on the XL and XE restricts this to only one other player) on a barren alien planet and it is up to you to settle on a plot of land and develop the planet's resources. Your goal is to make as much money as possible and amass the greatest number of points in order to gain the title of 'First Founder'. To do this you must buy, sell and trade your produce. You are helped (and even hindered!) in your task by a mysterious mechanical creature known as a M.U.L.E. (Multiple Use Labour Element).

At the outset you can choose from 8 different game characters with oddball names such as Bonzoid, Gollumer and Flapper. Each character has its own particular skills and capabilities and you must use them to their best advantage. During your daily toil you will be handicapped by random events like planet-quakes, acid rain, pest attacks and even runaway M.U.L.E.'s. You can't plan for them but they all add extra enjoyment to the game.

There are ways to make a fast buck other than working such as paying a visit to the pub or catching the Wampus who lives in the caves (he'll pay you to let him go) and, in the higher levels, mining the valuable 'Crystite' mineral. At the end of the day though, success depends upon your exploitative skills.

All events are represented graphically with lots of fine animation and good use of colour. The sound effects are excellent too, particularly the catchy title music. The packaging is up to Ariolasoft's usual standards and comes complete with a comprehensive 18 page manual.

It is difficult to do a game of such

complexity proper justice in a short review. It won't appeal to everybody but if you are tired of arcade-style games or never liked them in the first place, then you'll find M.U.L.E. one of the most fascinating and imaginative games available anywhere.



MURDER ON THE ZINDERNEUF

Electronic Arts/Ariolasoft
48k disk only £14.95
1 player
Joystick

Fancy a game of Cluedo? This strategy game from Electronic Arts is more or less an enhanced version of the popular Waddington board game.

The plot reads exactly like an Agatha Christie 'whodunnit' and goes something like this: The year is 1936 and the luxury airship ZINDERNEUF is flying 5,000 ft above the Atlantic Ocean on a voyage from London to New York. There were 16 passengers on board when the ZINDERNEUF left London but now one of them has been brutally murdered. You play the part of the detective who has the job of solving this hideous crime and you have just twelve hours (36 minutes of real time) in which to do so.

You begin by choosing your detective character from a list of eight. They are all based on famous fictional detectives but their names have been altered slightly to give them a comical appearance. Thus Inspector Cluseau becomes Inspector Klutzeau, Hercule Poirot becomes Achille Merlot, Miss Marples is Agatha Marbles and so on.

The screen display is a plan view of the passenger section of the ZINDERNEUF and you use the joystick to guide your detective round the many rooms and corridors of the airship, searching for clues and passengers to interrogate.

You may question the passengers in a number of different ways and your approach is all important as it determines how the passengers will react. If they like your approach you may glean some worthwhile information from them but if they don't like it they may tell you to 'Take a hike' or 'Jump in the lake'! By carefully studying the clues and various pieces of verbal information you should be able to come to a logical conclusion as to the identity of the killer. You then present your 'final accusation' whereupon the murderer's true identity is revealed along with their reasons for committing the crime. If your accusation is correct you are then awarded a rank based on how well you solved the crime. If it is incorrect all you get is a torrent of abuse!

Once again the game packaging is first class and the instruction booklet is a riot. Reading it is almost as much fun as playing the game. If you are looking for a game that exercises the brain rather than the trigger finger why not take a trip aboard the ZINDERNEUF? It beats playing Cluedo anyday.

ONE-ON-ONE

Electronic Arts/Ariolasoft
48k cassette £9.95
48k disk £14.95
1/2 players
Joystick(s)



If you follow the sport of basketball, American style, you will be familiar with the term 'one-on-one'. For the uninitiated it simply means one against one and in this sports simulation you can enjoy a basketball shakedown against the computer or a friend.

The game itself was written in conjunction with American pro-basketball players, Julius Erving and Larry Bird and you have the option of controlling a computer version of either player. Several difficulty levels are selectable at the start of every game, ranging from 'Park and Rec' (easy) through to 'Pro' (very hard) and you can also set a number of game parameters to choose a timed game with four quarters of play or to play to a set score, and to have 'winners out' or 'losers out' after a score is made. If all these terms sound like double-dutch to you, don't worry as they are clearly explained in the instructions enclosed with the program.

The actual play centres around one end of the court only. Joystick control of your player is surprisingly easy and all offensive and defensive manoeuvres such as dribbling, spins, jump-shots, steals and blocks are carried out with a combination of complicated joystick and firebutton commands. Graphics are excellent with some of the slickest animation you are ever likely to see.

Foul plays are catered for in the higher levels of play with the referee putting in a regular appearance to make sure justice is done. There is even a 'fatigue' element built in to the game and bar graphs at the bottom of the screen indicate how strong/fatigued your player is. When things get critical you can take a 'time out' to restore your player's flagging strength.

ONE-ON-ONE is another game which is best played against a human opponent (the computer is just too damn good!). I would have preferred a full blown basketball game with two separate teams rather than single players but this is certainly a worthwhile alternative.

HARD HAT MACK

Electronic Arts/Ariolasoft
48k cassette £9.95
48k disk £12.95
1 player
Joystick



The version I reviewed in issue 16 was an import which was available on disk only but now ARIOLASOFT have made the game available on cassette. It is still the same game though and faces stiff opposition from the many other platform games around.

Also received for review

STRIP POKER from U.S.GOLD. 64k cassette or 48k disk at £9.95 or £14.95.

Reviews next issue include RED MOON and WISHBRINGER. Adventure fans should not miss it!

ST METACOMCO & THE ST

Metacomco is a name much in the news recently for its work on Commodore's Amiga but this conceals a much longer history within the personal computer market. One of their earliest major software projects was working with Digital Research (of CP/M fame) on what became Personal BASIC which will be the ST's BASIC. Since that time, Metacomco has developed TRIPOS, a multitasking OS (the core of the Amiga OS) as well as a formidable array of languages and development tools - ISO Pascal, LISP, BCPL, editors, linkers and much more.

QL users will already be familiar with Metacomco's Editor/Assembler package as well as an excellent ISO PASCAL so it should come as no surprise that they are producing a full range of languages and development tools for the Atari 520ST.

The first, and most essential, release is a Screen Editor which allows easy development of source code with its range of immediate and extended commands. One slight disappointment is the installation on GEM which is of the 'TOS takes parameters' application type rather than a full integration into the GEM environment although this proves to be no handicap in operation. The default text buffer is 16,500 words (approx. 60K) which should be sufficient for most applications but may be increased if required. The immediate mode allows quick and easy movement around the screen whilst entering text and editing with the extended mode gives access to a useful range of facilities covering block control, movement, search and exchange, altering text and repeating commands.

The next release should be a full feature 68000 Assembler (currently in Beta test) which will incorporate the Editor (as should the other language packages). When I spoke to Metacomco about the Editor, I was assured that initial purchasers of this package would be able to obtain some adjustment in price or similar if purchasing a similar package incorporating the Editor.

Future releases include a full ISO standard Pascal which will produce native code, Lattice C (a very powerful 16-bit K&R implementation with extensive libraries), BCPL (also a very full and powerful version) and LISP (Cambridge, an implementation previously available only on mainframes and mini's). By themselves, this range of software would make the ST a very powerful software development system but combined with a price tag of under £100 per language package, Metacomco make the Atari ST into the most powerful system for under £1000. To illustrate this point a little further, Lattice C averages around £400 for any other 16-bit machine and I believe a Mini or Mainframe Cambridge LISP would cost well into four figures. You will be able to buy both plus a 520ST and still have change from £1000!

There is a note of caution though. Don't expect to see large numbers of entertainment packages suddenly appearing. The first releases are unlikely to make use of more than a fraction of the machine's capabilities as it takes time (lots of it) to develop software using the best part of half a megabyte of memory in an efficient manner. It's all too easy with sloppy coding. Atari have provided a very powerful machine and Metacomco are producing a powerful set of tools for using it but it's up to software houses and individuals to get the best from the machine.

Lawrence Miller

BLITZ

by A.S.Dewdney

This game is a version of one of the the classic computer games and will run on any Atari.

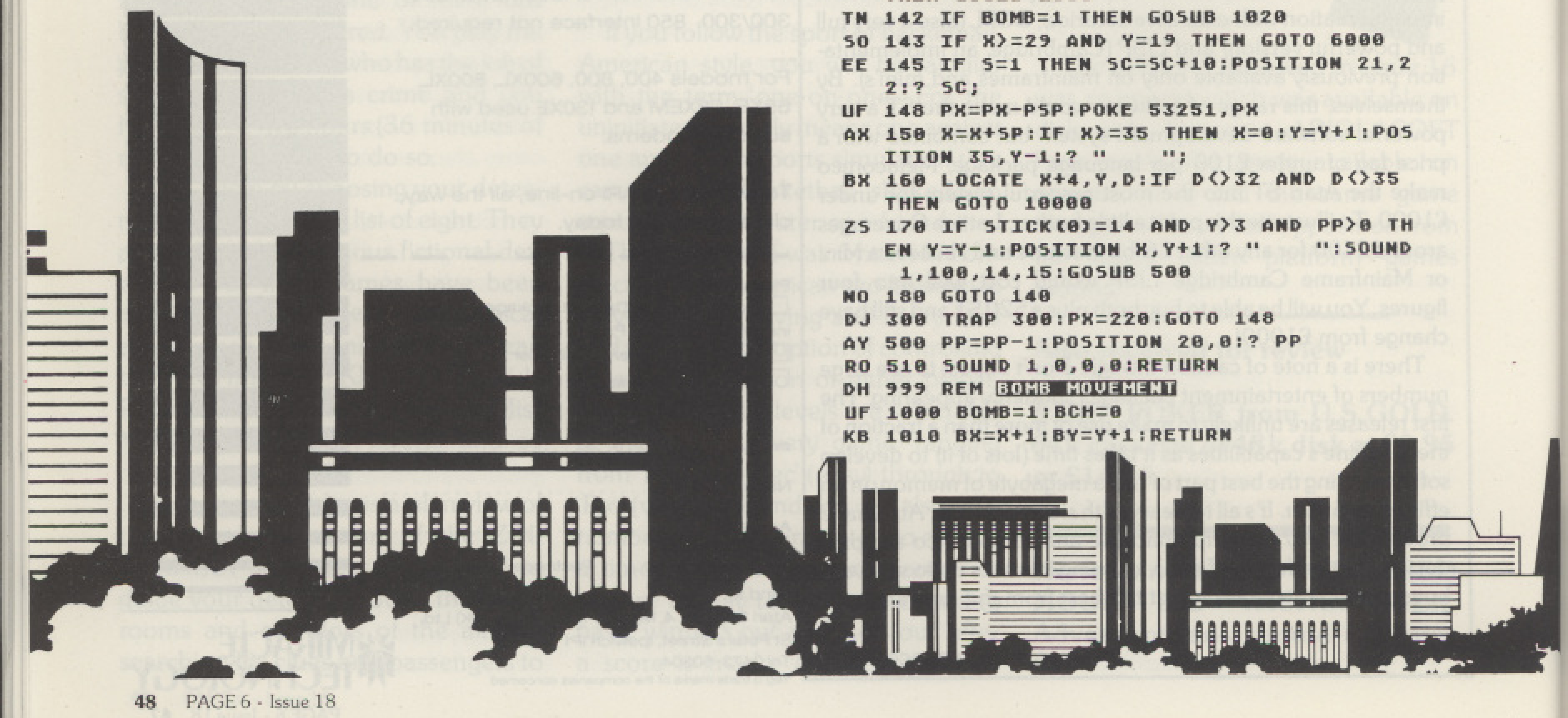
You are the pilot of an old bomber flying low over a deserted city. Suddenly one of your engines fails and you begin to rapidly lose height. The situation looks hopeless when you suddenly realise that you have a full bomb bay! Your only chance is to bomb all the building s flat so that you can land safely. If you land safely you are awarded 1000 points before going on to another city. The buildings will be higher and your bombs will become less effective. To make things a little easier you have on board 3 emergency boosters which will provide some extra height. You will be awarded an extra booster after clearing each city.

The program is written using Graphics 0 which only permits 2 colours. To make the game more interesting Players have been used to form the sun, clouds and an extra plane.

The effects used in the title page are achieved using the Colourflow program from issue 14 of PAGE 6. When you crash, the whole screen appears to shudder which is done by scrolling the screen up and down. The game also awards ratings and includes a hi-score feature.

Happy Landings.

```
EI 1 REM ********************************
YC 2 REM *            BLITZ             *
VW 3 REM *        by A.S.DEWDNEY        *
EB 4 REM * ---------------------------- *
IY 5 REM *  PAGE 6 MAGAZINE - ENGLAND   *
EN 6 REM ********************************
NM 7 REM
LN 9 RESTORE 30000:GOSUB 24000
JW 10 GRAPHICS 0:POKE 752,1:POSITION 14,1
   0:? "PLEASE WAIT"
VM 11 SETCOLOR 2,9,8:SETCOLOR 1,0,0:SETCO
   LOR 4,3,8
WG 12 GOSUB 20000:FOR T=53428 TO 53251:PO
   KE TT,0:NEXT T
CI 13 GOSUB 9000:? "↖"
OV 15 GOSUB 7000:SC=0:BS=4:PP=3
ES 16 ? "↖":POKE 82,2:PSP=SP*2
YF 17 POKE 53248,160:POKE 53249,70:POKE 5
   3250,110
KO 20 Y=21:? "↖":S=0
BY 21 COLOR 93:PLOT 0,1:DRAWTO 39,1:PLOT
   39,1
HH 25 POSITION 4,0:? "<<<BLITZ>>>    B_";P
   P
YL 26 H$=STR$(HISC):POSITION 26-(LEN(H$)-
   1),0:? "HISCORE_";HISC
TJ 27 PX=250:POKE 53251,PX
IU 28 POSITION 15,22:? "&'@() ";SC;
DV 30 FOR T=4 TO 32 STEP 2
AB 40 FOR G=0 TO HI+(RND(0)*8)-4
EG 50 Y=Y-1:POSITION T,Y:? "*"
CX 60 NEXT G:POSITION T,Y:? "+"
IH 70 Y=21:NEXT T
FA 80 FOR T=5 TO 33 STEP 2
XD 90 FOR G=0 TO HI+(RND(0)*6)-3
UX 100 Y=Y-1:POSITION T,Y:? "-"
NI 110 NEXT G:POSITION T,Y:? "="
RN 120 Y=21:NEXT T
JW 125 SOUND 0,255,12,6
OB 130 X=1:Y=3:TRAP 300
PC 135 REM MAIN LOOP
ZV 140 POSITION X,Y:? " ,./"
GS 141 IF STRIG(0)=0 AND BOMB=0 AND Y<19
   THEN GOSUB 1000
TN 142 IF BOMB=1 THEN GOSUB 1020
SO 143 IF X>=29 AND Y=19 THEN GOTO 6000
EE 145 IF S=1 THEN SC=SC+10:POSITION 21,2
   2:? SC;
UF 148 PX=PX-PSP:POKE 53251,PX
AX 150 X=X+SP:IF X>=35 THEN X=0:Y=Y+1:POS
   ITION 35,Y-1:? "    ";
BX 160 LOCATE X+4,Y,D:IF D<>32 AND D<>35
   THEN GOTO 10000
ZS 170 IF STICK(0)=14 AND Y>3 AND PP>0 TH
   EN Y=Y-1:POSITION X,Y+1:? "    ":SOUND
   1,100,14,15:GOSUB 500
NO 180 GOTO 140
DJ 300 TRAP 300:PX=220:GOTO 148
AY 500 PP=PP-1:POSITION 20,0:? PP
RO 510 SOUND 1,0,0,0:RETURN
DH 999 REM BOMB MOVEMENT
UF 1000 BOMB=1:BCH=0
KB 1010 BX=X+1:BY=Y+1:RETURN
```

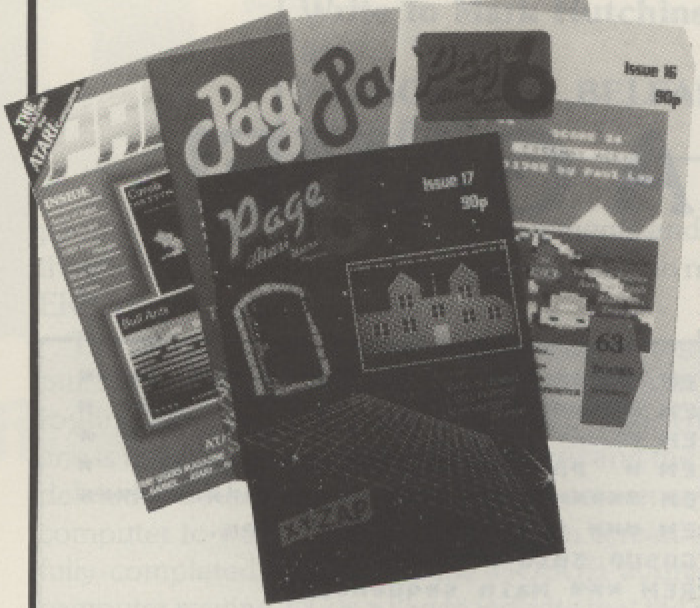


```
LF 1020 IF BY>=18 THEN POSITION BX,BY:? "
    ":BOMB=0:BCH=0:SOUND 1,0,0,0:S=0:RETU
    RN
YX 1021 BY=BY+1
LP 1023 IF S=1 THEN SOUND 1,30,8,9:S=0
TM 1025 POSITION BX,BY:? "#"
GN 1026 POSITION BX,BY-1:? " "
AB 1030 LOCATE BX,BY+1,BD
OW 1040 IF BD<>32 THEN BCH=BCH+1:S=1:IF B
    CH>BS THEN BCH=0:BOMB=0:POSITION BX,BY
    :? " ":S=0:SOUND 1,0,0,0:RETURN
AR 1060 RETURN
HT 5999 REM WELL DONE!
IB 6000 SOUND 0,0,0,0:SOUND 1,0,0,0:BOMB=
    0:S=0:BCH=0:CITY=CITY+1
AH 6005 IF CITY=4 THEN GOSUB 13000:CITY=1
DD 6010 POSITION 12,10:? "CONGRATULATIONS
    !"
KI 6015 IF HI>=11 AND BS>4 THEN BS=BS-1
BZ 6016 IF HI>11 AND BS<5 THEN SP=1
JM 6020 FOR T=1 TO 40:SOUND 1,205-(T*2),8
    ,15:SC=SC+25:POSITION 21,22:? SC;:SOUN
    D 1,0,0,0:NEXT T
II 6030 FOR T=1 TO 150:NEXT T:IF HI<12 TH
    EN HI=HI+2
UH 6040 POSITION 11,11:? "    GET READY!"
KX 6050 FOR T=1 TO 100:NEXT T
SJ 6060 GOTO 16
PF 6999 REM PLAYERS
VY 7000 P=PEEK(106)-8
PG 7005 RESTORE 7070
VU 7010 POKE 54279,P:PMB=P*256:POKE 559,4
    6
EW 7020 POKE 53277,3
SI 7030 POKE 704,30
IX 7050 FOR T=PMB+512+35 TO PMB+512+42
VV 7060 READ A:POKE T,A:NEXT T
YS 7070 DATA 60,126,255,255,255,255,126,6
    0
US 7080 POKE 705,14
EP 7090 POKE 53257,3
RK 7100 FOR T=PMB+640+50 TO PMB+640+57
VI 7110 READ A:POKE T,A:NEXT T
YF 7120 DATA 60,126,255,255,255,255,126,6
    0
MD 7130 FOR T=PMB+768+42 TO PMB+768+47
VR 7140 READ A:POKE T,A:NEXT T
MN 7150 DATA 16,56,124,255,62,24
US 7155 POKE 706,14:POKE 53258,3
AQ 7160 PX=250:POKE 53251,PX
PA 7170 POKE 707,62:POKE 623,9
SM 7180 RESTORE 7200:FOR T=896+PMB+45 TO
    896+PMB+52
WG 7190 READ A:POKE T,A:NEXT T
HJ 7200 DATA 12,25,51,254,48,24,12,4
AM 7210 RETURN
KQ 7999 REM RATINGS
JU 8000 FOR T=53248 TO 53251
GH 8010 POKE T,0:NEXT T
RH 8020 SOUND 1,0,0,0:SOUND 0,0,0,0:SETCO
    LOR 2,9,8
LG 8030 ? "K"
PF 8035 IF SP=1 THEN SC=SC+1000
DF 8040 IF SC<700 THEN A$="USELESS":GOTO
    8200
JW 8050 IF SC<2000 THEN A$="POOR":GOTO 82
    00
TI 8060 IF SC<5500 THEN A$="LEARNER":GOTO
     8200
AA 8070 IF SC<8000 THEN A$="NOT BAD!":GOT
    O 8200
DW 8080 IF SC<9000 THEN A$="HOT STUFF!":G
    OTO 8200
UU 8090 IF SC<12000 THEN A$="EXCELLENT!":
    GOTO 8200
FH 8100 IF SC<19000 THEN A$="ACE!":GOTO 8
    200
BH 8110 A$="BRILLIANT!!"
QX 8115 IF SP=1 THEN SC=SC-1000
RX 8200 POSITION 6,6:? "YOUR RATING IS: "
    ;A$
LW 8210 POSITION 6,8:? "PRESS START TO CO
    NTINUE"
EX 8220 IF PEEK(53279)<>6 THEN GOTO 8220
AV 8230 GOSUB 9000
AW 8240 RETURN
WB 8999 REM INSTRUCTIONS
QJ 9000 ? "K":HI=5:SP=1:POKE 82,6:? :FOR
    T=53248 TO 53251:POKE T,0:NEXT T
RN 9005 POKE 559,0
RL 9010 ? " ,./      ### BLITZ ###       "
AS 9020 ? "          [[[[[[[[[[[         "
MC 9030 ? " #  FLY YOUR WORLD WAR II"
QQ 9040 ? "    BOMBER OVER THE DESERTED"
AM 9050 ? "    CITY AND TRY TO BOMB ALL"
YG 9060 ? "    THE BULDINGS SO YOU CAN"
KP 9070 ? "     LAND SAFELY!"
RG 9080 ? "+                              ="
QI 9081 ? "*  AFTER EACH SUCCESSFUL      -"
GV 9082 ? "*  LANDING YOU ARE AWARDED -"
TW 9083 ? "*  A BONUS BEFORE GOING ON -"
OG 9084 ? "*  TO A HARDER CITY           -"
VN 9085 ? "*                             -"
CB 9086 ? "*  <THE FIRE BUTTON BOMBS> -"
UL 9087 ? "*  PUSH THE JOYSTICK UP TO -"
XX 9088 ? "* FIRE OFF YOUR 3 EMERGENCY-"
MX 9089 ? "* BOOSTERS FOR MORE HEIGHT!-"
ZO 9090 ? "*=  SPEED :FAST:  <OPTION> -"
YX 9100 ? "*-                            -"
GI 9110 ? "*- TOWERS :LOW :  <SELECT> -"
SP 9120 ? "*-+                         +-"
YP 9130 ? "*-*  PRESS START TO PLAY  *-"
QK 9131 ? "*-*=                       =*-"
AP 9140 ? "*-*-*-*-*-*-*-*-*-*-*-*-*-*-";
BP 9145 POKE 559,46
WG 9150 CON=PEEK(53279)
DY 9155 IF CON=6 THEN RETURN
WS 9160 IF CON=5 AND HI=5 THEN HI=10:POSI
    TION 17,19:? "HIGH":GOTO 9210
OS 9170 IF CON=5 AND HI=9 THEN HI=5:POSIT
    ION 17,19:? "LOW ":GOTO 9210
NT 9180 IF CON=3 AND SP=1 THEN SP=0.5:POS
    ITION 17,17:? "SLOW":GOTO 9210
DE 9190 IF CON=3 AND SP=0.5 THEN SP=1:POS
    ITION 17,17:? "FAST":GOTO 9210
CR 9200 IF CON=6 THEN RETURN
VG 9210 FOR G=1 TO 10:NEXT G:GOTO 9150
KU 9999 REM CRAAAASH!!
PY 10000 POSITION X,Y:? #6;" ,./":SOUND 0
    ,0,0,0:BOMB=0
NF 10010 GOSUB 11500
AJ 10012 FOR G=1 TO 50:NEXT G
LN 10015 SETCOLOR 2,9,8
EF 10016 IF SC>HISC THEN HISC=SC
VL 10020 GOSUB 8000:SC=0:PP=3
QZ 10040 ? "K":GOTO 16
EH 11016 IF SC>HISC THEN HISC=SC
KM 11500 FOR S=15 TO 3 STEP -2
OC 11520 X=(S/3)+0.2
OB 11530 FOR T=32 TO 20 STEP -X:POKE 560,
    T:SOUND 1,100,6,5
QL 11540 SOUND 1,60,8,5
AW 11545 SETCOLOR 2,T,T
LW 11550 NEXT T
WX 11560 FOR T=20 TO 32 STEP X:POKE 560,T
    :SOUND 1,60,8,5
BE 11565 SETCOLOR 2,T,T
ME 11570 NEXT T
LW 11580 NEXT S
DV 11590 POKE 560,32
YZ 11600 FOR T=3 TO 0 STEP -0.1
YN 11610 SOUND 1,T*9,8,T
LR 11630 NEXT T
DU 11700 RETURN
VB 12999 REM EXTRA BOOSTER
VU 13000 FOR D=1 TO 50:NEXT D
DT 13010 PP=PP+1
AK 13020 POSITION 20,0:? PP
UZ 13030 FOR T=15 TO 0 STEP -0.5:SOUND 1,
    40,10,T:NEXT T
WK 13040 FOR D=1 TO 50:NEXT D
DX 13050 RETURN
XH 19999 REM DEFINE CHARACTERS
LV 20000 DIM DEF$(26):DEF$="=-+*,./#&'@()
    1234567890[_]":DIM A$(30),H$(10)
EH 20010 START=(PEEK(106)-8)*256:RDL=5734
    4:FOR I=0 TO 512:POKE START+I,PEEK(RDL
    +I):NEXT I
```

→

BLITZ continued from page 49

```
JE 20015 RESTORE 20050
NN 20020 FOR I=1 TO 26:POS=START+(ASC(DEF
   $(I))-32)*8:FOR J=0 TO 7:READ A:POKE P
   OS+J,A:NEXT J:NEXT I
SU 20030 FOR I=32 TO 39:POKE START+I,255-
   PEEK(RDL+I):NEXT I:POKE 756,START/256:
   RETURN
GB 20050 DATA 24,60,126,255,255,255,255,2
   55
RJ 20060 DATA 255,255,255,129,129,129,255
   ,255
XS 20070 DATA 24,24,60,60,102,126,195,255
LI 20080 DATA 137,255,145,255,137,255,145
   ,255
EE 20090 DATA 32,48,56,63,63,31,0,0,0,24,
   36,255,51,255,0,0,0,32,32,160,224,160,
   32,32
IU 20100 DATA 255,24,60,102,66,126,102,60
BC 20156 DATA 124,198,192,124,6,198,124,0
KE 20157 DATA 0,124,198,128,128,128,198,1
   24
GS 20158 DATA 124,198,130,130,130,198,124
   ,0
MA 20159 DATA 0,252,134,134,252,240,156,1
   34
GG 20160 DATA 252,134,128,240,192,134,252
   ,0
DF 20161 DATA 24,56,24,24,24,24,60,0
JY 20162 DATA 124,198,134,12,56,98,254,0
LZ 20163 DATA 124,198,2,30,2,198,124,0
QG 20164 DATA 60,96,192,152,222,124,24,0
ZR 20165 DATA 254,128,128,252,6,198,124,0
YY 20166 DATA 124,230,192,252,198,198,124
   ,0
BP 20167 DATA 126,198,12,24,48,48,48,0
LL 20168 DATA 124,198,198,124,198,198,124
   ,0
IX 20169 DATA 124,198,198,126,6,198,124,0
YW 20170 DATA 124,198,138,146,162,198,124
   ,0
LX 20180 DATA 255,0,255,0,0,0,0,0
EJ 20190 DATA 0,0,0,60,0,60,0,0
JG 20200 DATA 0,0,170,0,170,0,0,0
YV 23999 REM TITLE PAGE
JN 24000 GRAPHICS 0:SETCOLOR 2,3,6:SETCOL
   OR 4,1,8
NW 24005 SETCOLOR 1,0,12
VW 24010 POKE 752,1
AE 24020 POKE 82,3:? :? :?
AV 24030 ? :?"  A.S.D Presents..."
DF 24040 ? :?
WT 24050 ? "[graphics characters]"
OT 24060 ? "[graphics characters]"
JX 24070 ? "[graphics characters]"
WL 24080 ? "[graphics characters]"
GF 24090 ? "[graphics characters]"
GA 24100 ? "[graphics characters]"
XW 24110 ? "[graphics characters]"
ER 24120 ? :? :? "     AN EXPLOSIVE EXPERI
   ENCE!"
YA 24130 COLOR 148:PLOT 0,0:DRAWTO 39,0:D
   RAWTO 39,23:DRAWTO 0,23:DRAWTO 0,0:PLO
   T 0,0
AF 24250 POSITION 0,19
GT 24260 ? "+          --PRESS <START>--"
MH 24270 GOSUB 30000
PL 24280 SOUND 1,0,0,0:SOUND 2,0,0,0
DV 24500 RETURN
BH 29999 REM COLOURFLOW!
XQ 30000 FOR D=1536 TO 1558:READ M:POKE D
   ,M:NEXT D
FP 30010 DATA 104,173,11,212,101,20,141,1
   0
BX 30020 DATA 212,141,24,208,173,31,208,2
   01,6,240,3,76,1,6,96
VN 30025 SOUND 1,240,10,6:SOUND 2,242,10,
   6
QY 30030 A=USR(1536)
DP 30040 RETURN
```



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You've already missed plenty, don't miss the rest!

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Overseas readers please see page 3

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*old style does not have a pause button.

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FIRST STEPS

WRITE A GAME!

By now you should all have the complete 'A-Z of ATARI BASIC', and I hope that you forgive any mistakes that occurred between my keyboard and the final copy.

The Editor and I have been discussing how best to follow this set of articles and he has talked me into trying to write a game, a section at a time, to illustrate BASIC *and involving reader's participation.* This sounds easy until you sit in front of a blank screen but one reader has come to my rescue. Albert Bidwell recently asked me how to write a noughts and crosses game and I have decided to use this game to explain some of the commands that were in the 'A-Z'. The examples used will follow most of the rules of programming, but will deviate where necessary so that it is easier to explain. I hope that I can keep this set of articles on a simple level to introduce the beginner to programming.

I hope that you are not sitting back saying, 'Oh great - a free game!'. I warn you here and now, *I am expecting lots of response from the readers* and if I don't get it the project may be doomed. I want you to improve the program in any way you can and send me your ideas and your own programming examples to illustrate how the game should be improved. Letters should be sent to me as soon as possible to give me time to set up the next article. You can still contact me direct with any problems but do enclose an S.A.E. if you require a reply.

As the next issue will be early for Christmas there will not be time to include your ideas in the next column but I would like to hear from as soon as possible so I can plan ahead. Remember though, without your response the column is doomed!

```
EI 1 REM ******************************
MQ 2 REM * FIRST STEPS - WRITE A GAME! *
EA 3 REM * --------------------------- *
IX 4 REM *  PAGE 6 MAGAZINE - ENGLAND  *
EM 5 REM ******************************
NS 9 REM *** Set up intro screen.
OD 10 GOSUB 5010
UT 98 REM *** Main sequence.
YI 999 GOTO 999
MX 5009 REM *** Set up intro screen.
MZ 5010 GRAPHICS 1:POKE 559,0:POKE 710,0:
   DIM A$(12),B$(12),X$(1),O$(1):CMPTR=10
   000:C=0:CO=C:COUNT=C:X$="☒":O$="▣"
LI 5015 POKE 752,1:FOR A=1 TO 100:? #6;"o
   ☒o☒";:NEXT A:POKE 559,34
KB 5019 REM *** Set up players.
NR 5020 ? "↰▶→→→→→→FIRST PLAYER IS X"
WV 5025 TRAP 5020:? "What is your name";:
   INPUT A$:? "Your opponent's name (* fo
   r computer)":INPUT B$:? "↰"
OO 5030 IF B$(1,1)="*" THEN TRAP 40000:CO
   =1
WD 5039 REM *** Set up main play screen.
GB 5040 GRAPHICS 2:POKE 559,0:POKE 712,40
   :SETCOLOR 3,4,10:POKE 756,226:POKE 752
   ,1
AW 5045 POSITION 7,2:? #6;"┌─┬─┬─┐":POSIT
   ION 7,4:? #6;"├─┼─┼─┤":POSITION 7,6:?
   #6;"├─┼─┼─┤"
KR 5046 POSITION 7,8:? #6;"└─┴─┴─┘"
AJ 5050 FOR Y=3 TO 7 STEP 2:FOR X=7 TO 13
    STEP 2:POSITION X,Y:? #6;CHR$(124);:C
   =C+1:NEXT X:NEXT Y:C=97
DL 5060 FOR Y=3 TO 7 STEP 2:FOR X=8 TO 13
    STEP 2:POSITION X,Y:? #6;CHR$(C);:C=C
   +1:NEXT X:NEXT Y:POKE 559,34:RETURN
```

Let's start. Normally we would start any program with a rough idea of how we want our game to run, i.e. the object of the game, rules, scoring etc. but as everyone already knows the game of noughts and crosses we can pass on to the initial flowchart of the game - termed the ALGORITHM. I have included an explanation with the algorithm, but in order to get you started I have also included a small program to show you how the 'FINISHED?' and 'AGAIN?' boxes work. Check out the program listing. The REMs should make it self explanatory enough.

If you now refer to the diagram you will see that the introduction screen is set up as a GOSUB routine. This is for reasons of speed as whenever a GOTO or GOSUB is used the computer starts at the beginning of the program to search for the required line. It will run far quicker having the main play sequence as near to the start of the program as possible.

If memory space is critical, all DIMensioning and initialising must be done first but it is preferable to set up the screen so that the players have something to look at while the computer is busy with its housekeeping. Once the screen is set up, all INPUTs must be answered and any errors must be TRAPped, otherwise the program will stop execution.

The algorithm may seem complicated and tedious, but in practice it is very simple. The graphics take up most of the listing and the error trapping only a few lines. Type in the listing and try some silly responses. Because the computer only checks for illegal strings it will take any legal input as your true name. If your name is longer than the length to which the name string is DIMensioned it will only store to the dimensioned length, so if you need more space use a longer DIMensioned string (A$ and B$).

Here are a few notes to help you with the program. Notice that the subroutine starts at 5010 and that I have placed a REM statement at 5009. Never, ever, send the program to a line containing just a REM statement. Many

by Mark Hutchinson

Write to Mark Hutchinson at P.O.BOX 123, BELFAST, BT10 0DB

people tend not to type in these statements and they are the first to go when more space is needed. So do not risk an ERROR 12 (look it up!).

The rest of the program should be easy enough to work out. Line 999 stops the program trying to run the subroutine again which would give an ERROR 16. This type of line is normally one of the first lines I use and the last to be deleted. POKE 559,0 switches off the screen causing the computer to work faster and the drawn screen to appear fully completed. CMPTR is the GOSUB address of the computer routine. CO is a flag to indicate that the computer is the opponent and COUNT is the flag for checking the number of turns. Notice in line 5020 the cursor control characters to save on a POSITION statement. The TRAP statement at line 5025 will send the program back to line 5020 if an illegal response is given to the question (starting a string with a number etc.), giving ERROR 8. If the responses are valid then TRAP 40000 clears the TRAP. CO decides if you will be playing the computer. The final part of the program sets up the main play screen and switches on the screen with POKE 559,34.

As the game is configured for the main play screen we will keep that as it is, however, I would like to see you try your hand at a new intro screen, that is, something to replace lines 5000 to 5020. You can go beyond 5020 if you wish as it is an easy matter to renumber the remaining lines.

Now that you have seen part of the program I will set you your first task. I would like over the next few weeks some intro titles with the best sound and graphics you can manage. In future columns I will publish different parts of the program but please do not expect to see the completed game for some time to come. If Les has the space he might include the completed program in the final part of this tutorial. Please print your program as neatly as you can. Underlining means inverse and square brackets mean control characters.

ALGORITHM DIAGRAM EXPLANATION.

We enter the algorithm at START. The first thing we encounter is a box that sends us to a GOSUB routine setting up the introduction screen. The box on the right shows us some of the things that must be done to set up this screen. When you have set up the screen to your own satisfaction, follow the path to the next box. At this point the player inputs information. If an ERROR occurs then a TRAP must be used to send the program back to the start of the input, otherwise the program will STOP. The next box is a decision. 'DO YOU NEED INSTRUCTIONS?'. If not then the program returns to the main sequence. If you do need instructions then continue down the path. Again errors must be taken care of. The next step is to clear the screen and print the instructions. Then the program waits to see if you have finished. This part is usually controlled by 'PRESS ANY KEY TO CONTINUE'. No input and it will wait. YES will continue the program. The next step asks you if you wish to view the instructions again. This can also be used if the instructions cover more than one page. YES sends the program to the point where you said YES to the question 'DO YOU NEED INSTRUCTIONS?'. If you decide you have seen enough, then the program returns to the main sequence. Again, errors must be taken care of.

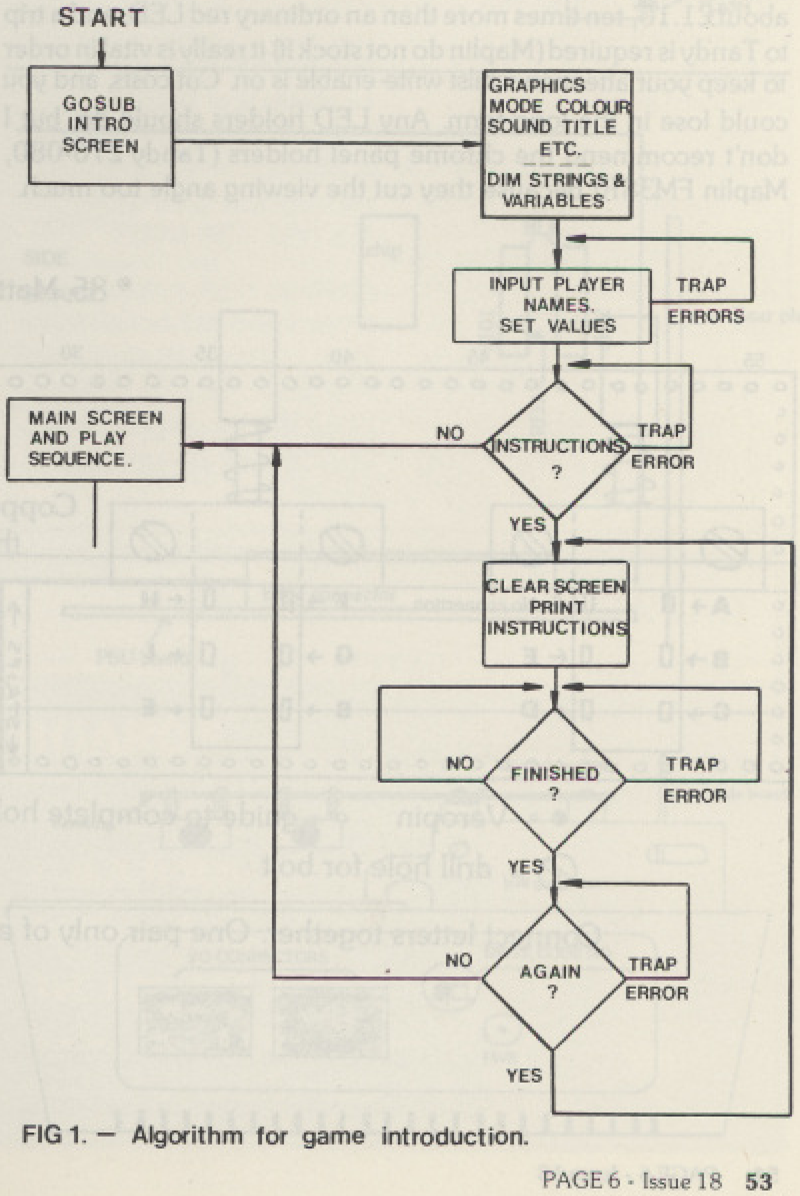


FIG 1. — Algorithm for game introduction.

The 8-

A write protect modificati

The purpose of this project is to enhance the write-protect capabilities of the Atari 810 disk drive. It will give you a switchable write protect tab so that you can ensure the safety of data, make one-off file changes, or use the B side of disks without cutting a hole.

To complete the modification you need to be a very competent circuit builder. It is extremely easy to make mistakes and just one slip-up could ruin your disk drive and cost you over £60 for repair. *If in doubt, give up!* Because of this, I have not aimed to give step by step instructions, so if you or a friend do not have such skills, I recommend you look at the Autotect reviewed in PAGE 6 as an alternative.

Undertaking this product will render the warranty of the 810 void. If you choose to do the alteration, read this article all the way through first.

COMPONENTS REQUIRED

1 x Verostrip (Maplin FL17T)
2 x locking DPDT push switches with single mounting bracket, screws, spacers and buttons. (Maplin FH67X, FH75S & FL31J or Tandy 275-9401)
1 x Green LED with holder
1 x Red flashing (see text) LED (Tandy 276-036) with holder
1 x packet of Veropins (Maplin FL24B)
1 x 5-way socket (Maplin BH66W & 5 x YW25C)
Wire (multicoloured)
2 x small right angle brackets (Meccano?)
3 x bolts/nuts/washers
2 x knurled washers

There are some components worth saying more about. Most important is the flashing red LED. Although this will cost you about £1.10, ten times more than an ordinary red LED, and a trip to Tandy is required (Maplin do not stock it) it really is vital in order to keep your attention whilst write-enable is on. Cut costs, and you could lose in the long term. Any LED holders should do, but I don't recommend the chrome panel holders (Tandy 276-080, Maplin FM38R) because they cut the viewing angle too much.

A proper PCB plug (Maplin RK67X) could be used if you wish, but I found Veropins quite satisfactory, and you need them anyway. Don't cut the present cable or you will not be able to restore the 810 to its original state if you want to.

Although Maplin and Tandy have been quoted as sources of supply, many of these components should be available from your local electronics shop.

CONSTRUCTION

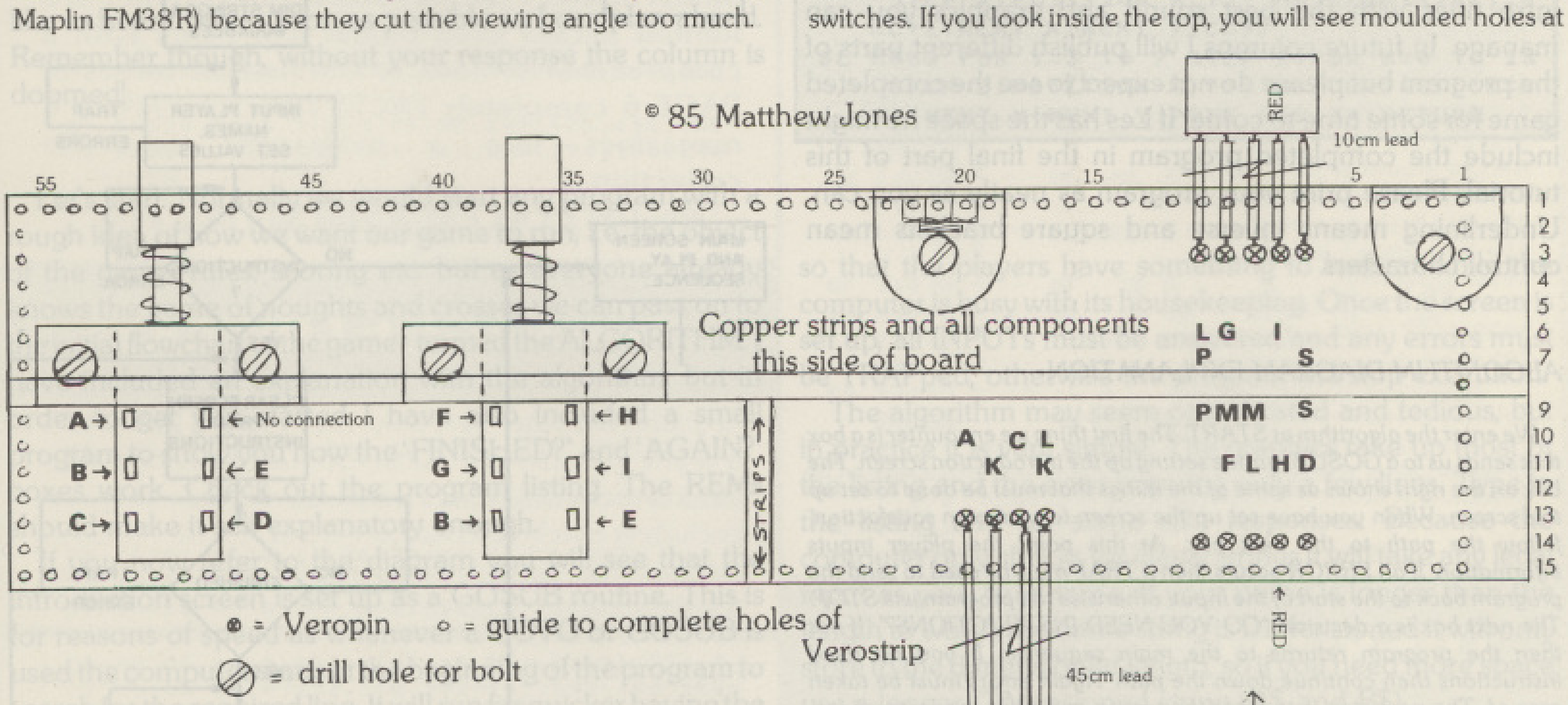
The diagrams should be sufficient for anyone capable of building the modification, but here are some hints you may find useful.

Make sure the 'veropin plug' is not obstructed by wire ends around it (a file may be required), or it may not 'make' properly and fall off later. Whatever plug type you use, make sure only the marked wire is red, in order to aid you in future. (The 810 pcb has the red wire marked).

I placed two LEDs next to the BUSY and PWR ON LEDs, but you could put them anywhere. Holes will have to be drilled to suit your holders.

The 810 top, removed by taking the four little discs at the top off to expose the screws, has to be modified to expose the switches. If you look inside the top, you will see moulded holes at

© 85 Matthew Jones



Connect letters together. One pair only of each letter.

8-tect

ication for 810 disk drives

the rear (opposites for the power in and drive select switches). Cut out the two large round holes with a sharp knife.

The switches themselves must be mounted on the PCB using spacers. I used an old ball point pen barrel cut at 7 mm intervals. These are needed to position the switches behind the holes. The switches are not soldered direct to the veroboard, but wired together, i.e. A to A, B to B etc. There are only two of each letter.

After you have built the board, wired up the LEDs and connected the flying socket, you *must* spend plenty of time checking your work. First, check that you have made all the right connections as shown in the diagram. Second, very carefully check that there are no solder splashes or strands of wire that are, or may be in future, shorting two points. Terrible damage can be caused by such shorts. Finally, repeat the two checks. If you find anything wrong, correct it, and start the checks again. You cannot be too careful.

Only when you have thoroughly checked your work should you fit it to the 810. Once you have unplugged the power lead, you have to locate plug number J101, which is at the back on the vertical board, and note the position of the red wire (also marked on the PCB). Gently remove the socket, (the plug has the pins) and fit it onto the Veropin plug, ensuring the red wire matches. Now connect your flying socket to J101, checking that the red wire follows through all the way from J101 to the original socket (ignoring the break on the Verostrip).

The two right angle brackets are each used in different ways. You will find one hole suitable for a bolt near the centre in the metal plate at the back of the 810. The two knurled washers are to be used with this bracket to hold it tightly in place without pivoting. The second bracket is used to help prevent pivoting whilst the switches are operated. It will rest inside the metal back plate to which the other bracket is bolted. When mounted at the back, the new board should not interfere with any drive components. If you drive is different, do not attempt to fit this modification, as the circuits may have changed.

8-Tect IN USE

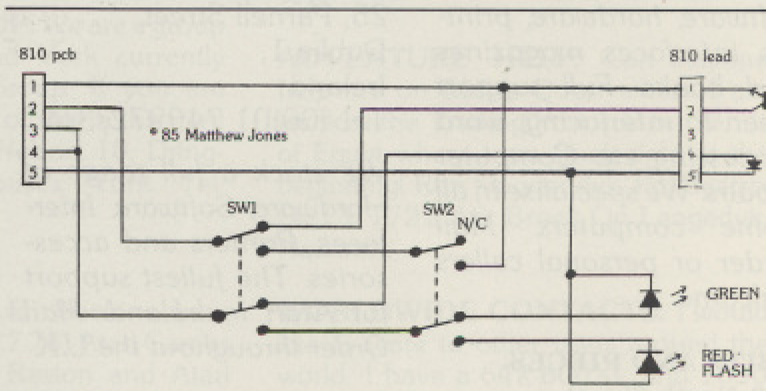
Ensure that the fitting has been done correctly, that you have connected the right sockets to the right plugs and got them the right way round (use the red wire as a guide). When all is okay, set both switches to their 'out' or 'extended' position. Leaving the 810 lid off for now, plug in the power lead and turn on at the front. Be ready to turn off *immediately* if no LEDs come on or the drive doesn't do its normal start-stop power up. (Re-check you wiring if all is not well.) Now press the 'inner' button and the green 'protected' LED should light. Press the 'outer' button and the red LED should flash continually. Press the 'inner' button again and only the power LED should remain on.

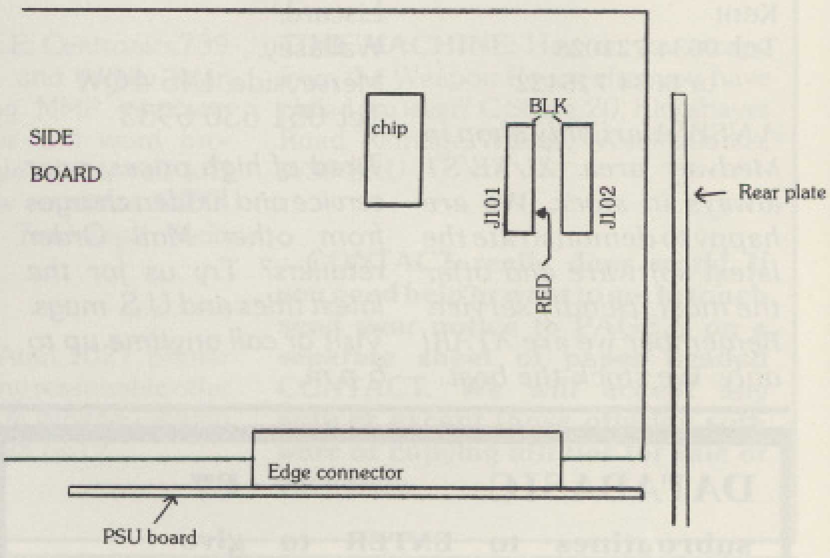
You must now test the write protection, using a blank disk, DOS formatter (DOS 2 selection I) and a write protect label. With only the ordinary LEDs on (inner button out), the drive should act as normal, obeying the write-protect tab. (If write-protected, the drive will give error 144 when you access it to format, otherwise it will format normally.) With a 'special' LED lit, the drive will either be write protected (green) or unprotected (flashing red). When all is tested and working, replace the 810's lid. The modification is complete.

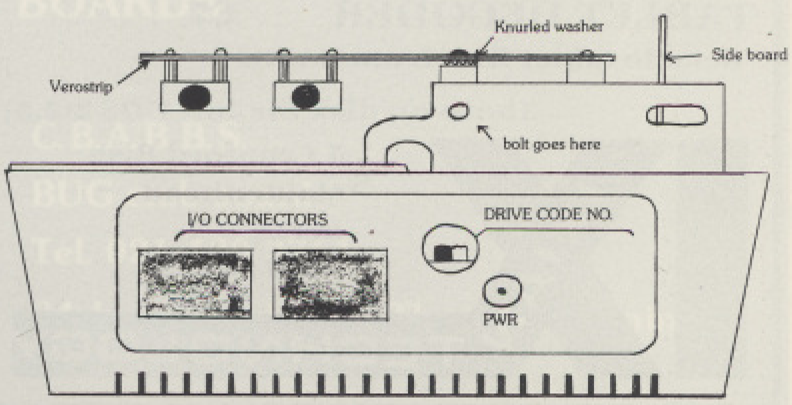
You may have thought that I have overdone the 'make sure you check it' warnings, but I haven't. To my cost, I hurried the 'production' version (having had a prototype going for months) and left a minute solder splash. With a mini fireworks display, I killed the infra-red LED and a few other parts. Fortunately I know the 810 well and have fixed it, but as I, the designer, can foul up, I hope you heed my warnings and check everything thoroughly.

No responsibility is accepted by the author, PAGE6 Magazine or any other party for any damage that may occur from the building of this project.

by Matthew Jones







GOTO DIRECTORY

The GOTO DIRECTORY is a guide to retailers who provide product support for Atari. Many of these retailers will supply Mail Order so if you have trouble finding a supplier, turn to the GOTO DIRECTORY.

Retailers who are interested in an entry in this feature are invited to contact the Editor on 0785 41153.

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contact

ANYONE KNOW GERMANY?: I have recently come across a few public domain programs and demos from users in Germany and they are *brilliant*. If anyone has any more or can put me in touch with any User Groups in Germany please get in contact. I would love to publish some of the programs or help distribute them in the UK if I can contact the authors. Les Ellingham c/o PAGE 6.

SPECIAL INTEREST GROUP: I am starting a special interest group for Atari home computers which will concentrate on matters such as music, robotics, computer art and other specialist activities. Initially we hope to offer two services -. a newsletter and a contact service. If any readers are interested could I invite them to write to me enclosing a stamped addressed envelope for an application form. G.Leader, 143, Richmond Road, Leytonstone, London, E11 4BT

ANALOG 16: Wanted or copy of Solid States with instructions from that issue. Will pay for issue or provide a blank disk and pay for photocopies. E.Jurdzis, The Astley, 33, Byron Close, Blacon, Chester, CH1 5XF

DECEASED 810: Non-working 810 disk drive with loads of disks. any offers? Phone J.Beard on 01-767 4732

RADIO HAMS: Can anyone help me to use my Atari for CW/RTTY/AMTOR. I have a full licence but we do not have much support for Atari in Belgium. Jansen Guido, Guido Gezellestraat 40, B-8390 Knokke-Heist 2, Belgium. Tel. 050/514554

ST USERS: We have just started an ST User group and would like to correspond to users of the ST in the UK and Europe to get together information about programs and demos etc. We hope to produce an ST newsletter quite soon. Choo-Sian Ong, P.O.Box 50423, Pasadena, CA 91105, U.S.A.
(PAGE 6 is also interested in getting together and distributing as many ST demos and public domain programs as possible. All disks returned with, hopefully, more goodies on. Ed.)

TIME MACHINE: Can anyone tell me how to get back onto the sand from the dark passage in the Egyptian Time Zone? Also in THE COUNT, how do you stop the flagpole from breaking? I can exchange help on Pirate Adventure, Voodoo Castle, Strange Odyssey, Mission Impossible, Golden Voyage and Golden Baton. Gavin Forster, 814, London Road, Leigh-on-Sea, Essex. Phone no. 73308

PEN PALS WANTED: I would like to make new friends in Great Britain, Europe, America. I have a 130XE and 1050 disk drive. Please write to David Morgan, 85, Walter Road, Ammanford, Dyfed, S.Wales. Tel. 0269 3266

CHALKBOARD POWER PAD: Does anyone have any software for this and technical information on how the unit works? John Dimmer, 16, Highdyke Road, Cranwell, Sleaford, Lincolnshire, EN34 8EJ. Tel. 0400 61383

YORK USER GROUP: We are a group of enthusiasts around York currently setting up a User Group. If you are interested in meeting others in this area please contact John Nelson, 10, Dringfield Close, Dringhouses, York. Tel. YORK 708391

BOOKS FOR SALE: Machine Language for Beginners £7.75, Atari Games and Recreations by Reston and Atari Basic by Wiley for £16.95 all inclusive. Michael Courtney, 64, First Avenue, Gillingham, Kent, ME7 2LG

PRINTER FOR SALE: Centronics 739 (same as Atari 825 and totally Atari compatible) including MMP interface, cable, manual, cover and word processor. Accepts single sheet, roll and fanfold paper. As new condition. £200. Tony Chamberlain, Tunbridge Wells (0892) 20694

1027 FOR SALE: Atari 1027 printer less than a year old. Any reasonable offer considered. Contact M.Whitney during the day only on 01 698 6412

HOME FILING MANAGER: Does anyone know how to change the number of line feeds between printing 'cards' and can the type styles be changed? Tony Chamberlain. 0892 20694

BACK ISSUES: PAGE 6 issues 1 & 2 required to completed set. Quality photocopies accepted. J. Stuart Buchan. Phone 0383 414349 (evenings)

AUSTRALIAN USER: My name is Ray Christie and I live in Victoria, Australia. We haven't had an Atari distributor out here for 10 months and I would like to write to folks in the UK to keep in touch. Please write to R.A.Christie, 15, Heather Grove, Greensborough 3088, Victoria, Australia

BOOKS AND MAGS FOR SALE: PAGE 6, Antic, Analog and many Atari related books for sale. Please send s.a.e. for list to H.Field, The Chimes, Bells Lane, Hoo, Nr. Rochester, Kent, ME3 9HT

ADVENTURE HELP: Can anyone help me on Dallas Quest where I am stuck at the Trading Post and on Sands of Egypt where I am stuck right at the beginning! Ron Hoogendyk, Prs Beatrix Str.13, 1721 AS, Broek Op Langedyk, Holland

WORLDWIDE CONTACTS: I would like to write to other users around the world. I have a 64k 600XL and 1050 disk drive. Ron Hoogendyk, Prs Beatrix Str.13, 1721 AS, Broek Op Langedyk, Holland

TIME MACHINE: How do you escape from the Weapon Room after you have pulled the lever? C.Shute, 20, Kingshayes Road, Aldridge, Walsall, West Midlands, WS9 8RU

CONTACT really does work! If you need help or want to get in touch send your notice to PAGE 6 on a separate sheet of paper headed CONTACT. We will accept any notices except those offering software or copying utilities for sale or exchange.

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Bug club call

The big event of the month has to be the PCW show at Olympia. The club organised a coach trip to London on the Sunday to see what had been described as 'the ATARI show' and, especially when you compare it to the episode we had two years ago, it was a great success. A few saw fit to have a lie in and miss the departure, but we went down with a full coach and returned happy and content. I'm sure the rest of the magazine has the show well documented but a little more shouldn't hurt. The exhibitors had obviously had a very hard week because they looked well and truly wacked. Atari had three large stands, one of which appeared to be coffee tables and another was full of ST's lying idle, It's a great idea having thirty or so machines for visitors to try out but something a little more interesting than the OS would have been appreciated. There *was* Kennedy Approach on one, but nobody seemed to know how to play it, and somebody had swiped the instructions! There was even one stand selling its software package but didn't have one to demo, and the pretty lady promoter didn't even know the price of the machine. I was looking forward to the Colourscape demo mentioned in the last PAGE 6 but it was on a screen so large that you needed to go to the other side of the hall to see it, where you couldn't hear the music through the constant beeping of games and Rambo videos.

But I don't really want to sound so negative, It was a great day out and I enjoyed myself immensely. It was also nice to see a bit of the competition which I have always ignored in Laskeys and Smiths. There was one demo on the ST that was really quite stunning. It was a file of high res colour pictures (well actually it was the lowest resolution on the ST) which could all be called from the disk and displayed on the screen at the same time, on top of each other, and then moved and cropped and altered and have the colour changed .... and it doesn't sound half as impressive as it looked. It is some machine.

Anyway, what else is new? C.B.A.B.B.S. (the Central Birmingham Atari Bulletin Board Service) is now up and running. So, if you have a modem you can get in touch with it, and BUG, by dialling 021-430 3761. During the first week on the air, it was contacted by 20 users, one of which was from Norway! It is running 24 hours a day except on Thursday evenings when the hardware is used at the club.

In the last few months there have been quite a number of new software releases and we must thank Software Express International for letting us preview them at club meetings as they have become available. It's good to be able to spend a night on them before splashing out. That's one advantage all you users who have refrained from joining the club are missing out on.

Mike Wilkinson

LISTER

by Mary Lynch

Lister was written for use on the 822 printer to aid in debugging program listings but should run on any other printer. It allows you to print a listing to any line length and divide it into manageable pages.

The program to be listed must be on tape or disk in LIST format e.g. LIST "D:PROGRAM" or LIST "C:". Just answer the on screen prompts.

```
UG 30000 REM ****************************
EB 30001 REM * LISTER by Linda Tinkler *
VK 30002 REM *          Feb. 1985          *
OB 30003 REM * ------------------------ *
UU 30004 REM *  PAGE 6 MAG. - ENGLAND  *
VF 30005 REM ****************************
JF 30009 DIM FILE$(15)
DB 30010 ? "↰LENGTH OF LINE ";:INPUT CL
TP 30020 ? "NUMBER OF LINES TO A PAGE ";:
   INPUT PL
HH 30030 ? "*SCREEN WILL GO BLANK WHILE L
   ISTING *      * IS BEING PRINTED *"
RV 30040 ? "NAME OF FILE TO LIST  use 'D:
   ' PREFIX or C: if cassette";:TRAP 3016
   0:INPUT FILE$
FG 30050 PK=PEEK(559):POKE 559,0
BC 30060 LPRINT ,,FILE$:LPRINT
BK 30070 TRAP 30160:OPEN #2,8,0,"P:":OPEN
    #1,4,0,FILE$
OQ 30080 L=1
WP 30090 FOR C=1 TO CL
NF 30100 TRAP 30170:GET #1,A
ZB 30110 ? #2;CHR$(A);
GH 30120 IF A=155 THEN 30140
VL 30130 NEXT C:? #2;CHR$(155);
XV 30140 L=L+1:IF L<=PL THEN 30090
YD 30150 FOR PG=1 TO 3:? #2:NEXT PG:GOTO
   30080
QF 30160 POKE 559,PK:? "ERROR CHECK FILEN
   AME AND HARDWARE THEN":? "TYPE 'GOTO 3
   0010' RETURN"
UB 30170 CLOSE #1:CLOSE #2:POKE 559,PK:TR
   AP 40000:END
```

□

BERTIE continued from page 10

```
BY 20240 DATA 173,221,6,24,109,218,6,133,
   206,76,152,6,173,221,6,24,105,1,141,22
   1,6,189,204,6,56,233,16,157,204
BA 20250 DATA 6,201,16,48,213,76,127,6,17
   3,219,6,24,109,216,6,133,204,169,0,133
   ,203,160,255,145,203,136,208,251
WA 20260 DATA 189,212,6,133,203,160,0,177
   ,205,145,203,200,192,16,208,247,174,21
   6,6,189,208,6,157,0,208,24,144
FU 20270 DATA 131,0,0,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0,0,0,0,192,208,224,240
   ,0,0,0,0,0,0,0
WM 20299 REM DATA FOR PMG
UX 20300 DATA 0,55,73,137,137,157,98,126,
   36,198,55,73,137,137,157,98,126,36,68,
   130
PG 20310 DATA 0,0,0,18,54,34,0,0,0,0,0,0,
   18,54,34,0,0,0,0,0
RC 20320 DATA 0,0,102,187,153,102,189,66,
   36,231,102,187,153,102,189,66,36,36,66
   ,129,0,62
QX 20330 DATA 127,127,127,62,0,0,0,0
IZ 20340 REM FINISHED!!
```

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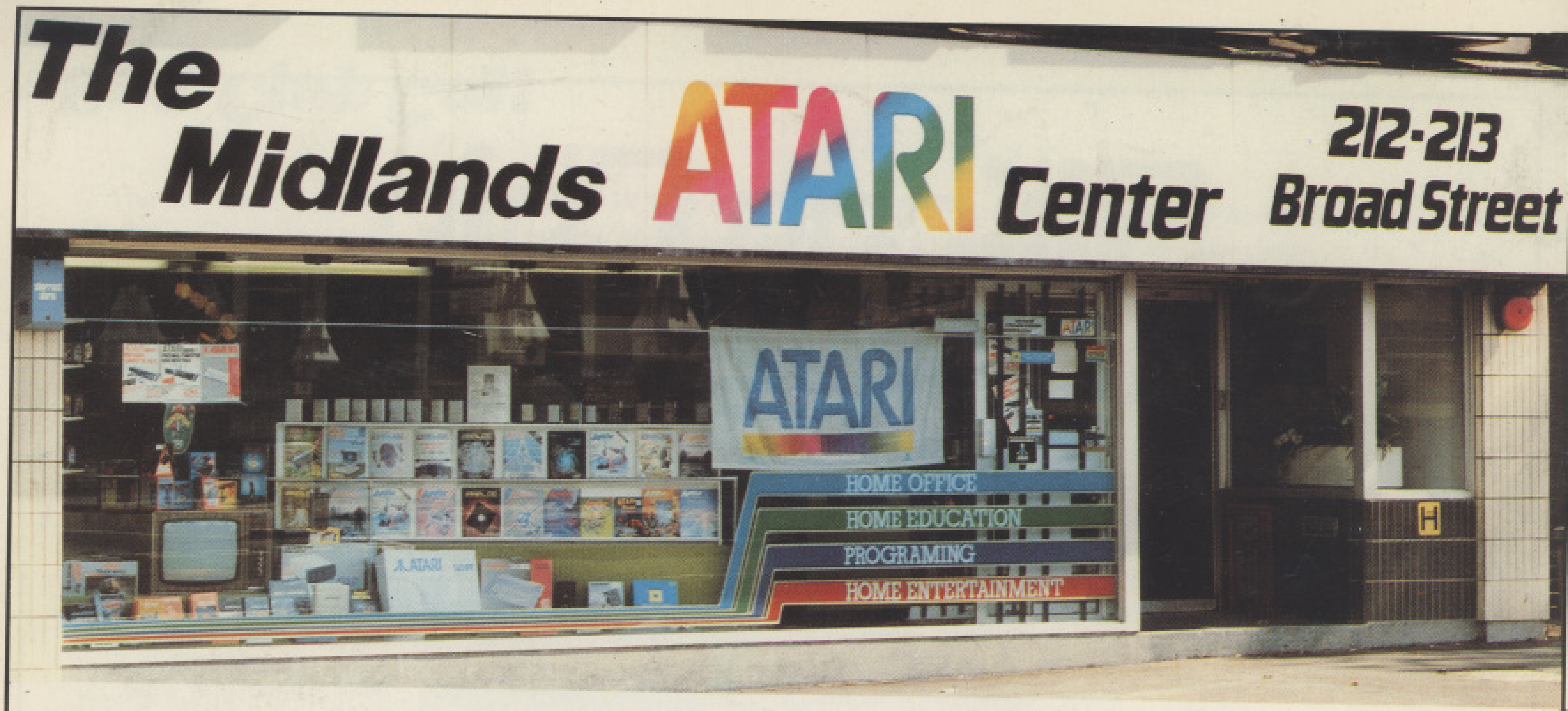
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